S. 260.
27.

THE ZOOLOGIST FOR 1869.

SECOND SERIES, pp. 1489—1952.

LONDON:
E. NEWMAN, PRINTER, DEVONSHIRE STREET, BISHOPSGATE.

THE

ZOOLOGIST:

A

POPULAR MISCELLANY

OF

NATURAL HISTORY.

CONDUCTED BY

EDWARD NEWMAN, F.L.S., Memb. Imp. L.-C. Acad.

SECOND SERIES.—VOLUME THE FOURTH.

(OR TWENTY-SEVENTH FROM THE COMMENCEMENT.)

BRITISH MUSEUM
NATURAL HISTORY BRANCH

LONDON:

JOHN VAN VOORST, PATERNOSTER ROW.

M.DCCC.LXIX.

If in the field I meet a smiling flower,
  Methinks it whispers, "God created me,
And I to Him devote my little hour
  In lonely sweetness and humility."
If, where the forest's darkest shadows lower,
  A serpent quick and venomous I see,
It seems to say, "I too extol the power
  Of Him who caused me at his will to be."
The fountain purling, and the river strong,
The rocks, the trees, the mountains, raise one song,
"Glory to God" reechoes in mine ear:
  FAITHLESS WERE I, IN WILFUL ERROR BLIND,
  DID I NOT HIM IN ALL HIS CREATURES FIND,
HIS VOICE THROUGH HEAVEN, AND EARTH AND OCEAN HEAR.

JAMES MONTGOMERY.

CONTENTS.

—o—

ALPHABETICAL LIST OF CONTRIBUTORS.

ANGUS, W. C.
On the occurrence of the white-throated sparrow in Aberdeenshire, 1547

BARRINGTON, R. M.
Abnormal dentition in the rabbit, 1843; Albino sand martin, 1847

BELL, ALWIN S.
Rare birds near Hastings, 1950; White partridges (? ptarmigan) near Ganton, Yorkshire, 1951

BELL, THOMAS, F.R.S., &c.
Zootoca *v.* Lacerta, 1868; Toads devouring bees, 1869

BIRCHALL, EDWIN
Irish insect-hunting grounds, 1549

BISSENDEN, JOHN
Blackthroated diver at St. Leonard's, 1684

BLACKMORE, H. P., M.D.
Barbastelle bat at Salisbury, 1558

BLAKE-KNOX, HARRY, J.P.
Ornithological notes from the County Dublin for 1867: extracts from the Log of the 'Gray Gull,' 1499; Glaucous and Iceland gulls in Kingstown Harbour, County Dublin, 1517; Iceland gull in Kingstown Harbour, 1564

BLOMFIELD, H.
Owl on Bishopsgate Church, 1846

BOYNTON, THOMAS
Shore and sea birds, 1843

BREE, C. R., M.D.
American robin, 1644

BRIGGS, J. J.
Rosecoloured pastor, 1866

BRIGGS, T. R. ARCHER
Late stay of martins, 1516

BROWN, JOHN A. HARVIE
Naturalists' Book Agency, 1512; Dartford warbler—Notes from Jersey, 1560; Rough notes from the Channel Islands, 1588, 1630; Ornithological notes from Stirlingshire, 1799, 1950

BRYDGES, Sir HARFORD J. JONES, Bart.
Summer ducks at Boultibrook, 1563

BURY, Rev. CHARLES A., M.A.
The death's head and the bees, 1913

CLARK, J. A.
Little auk at Loughton, 1867

CLARK-KENNEDY, ALEXANDER
Otters in Suffolk, 1557; White fox in North Wales, Pied hare in Suffolk, 1558; Notes on some of the rarer birds noticed in Suffolk in 1868, 1695; Ornithological notes from Suffolk, 1858; Woodchat in Kent in 1868, 1863

CLERMONT, Lord, F.L.S.
American bittern in Ireland, 1517

CLIFTON, Lord
Peregrine falcon in Kent, 1598; Gray wagtail and pied flycatcher in Kent, Tree sparrow and blackheaded bunting in Kent, 1599; Goldfinch, mealy redpole and lesser redpole in Kent, 1600

CLOGG, STEPHEN
Sexes of chaffinches, Rooks and rookeries, 1514; Scarcity of martins in 1868 in the neighbourhood of East Looe, 1516; Terns and gannets at East Looe, 1517; Bittern at Looe, 1562; Little gull at Looe, 1563; Mouse or spider, 1719; Early appearance of reptiles, 1724; Nightjar in October, 1919; Tits and their food, 1927

CORDEAUX, JOHN
Bird murder, 1512; Great black woodpecker, 1515; Ornithological notes from North Lincolnshire, 1543, 1666, 1736, 1840, 1905; Notes on bird parasites, 1583; On the variation in colour of the axillary plume of the golden plover, 1601; Dates of arrival of spring visitors at or near Great Cotes, North Lincolnshire, 1723; Aphides seen at sea, Plague of Aphides, Aphides in Lincolnshire, 1839; Wild animals eating porcupines, 1842; The last of the ladybirds, 1922; Notes from Spurn Point, 1942

Cornish, Thomas
Galatea Andrewsii at Penzance, 1601; Scyllarus arctus in berry, 1725
Crowley, Alfred
Number of eggs laid by the Dartford warbler, 1847
Dix, Thomas
Ornithological notes from Pembrokeshire, 1670
Doubleday, Henry
Young chaffinches in nestling plumage, 1561
Farren, W.
Late singing of the nightingale and the cuckoo, Rare variety of the great tit, 1847
French, David John, F.L.S.
Early birds' nests, 1603
Gatcombe, John
Effects of the late inclement and unseasonable weather, 1917; Rednecked phalarope in the neighbourhood of Plymouth, 1920
Gordon, Charles
Shore lark in captivity, 1513
Gould, John, F.R.S., &c.
Great black woodpecker in Hampshire, 1516
Gravil, J. F., jun.
Osprey at Epworth, Peregrine falcon at Epworth, Merlin near Epworth, 1559; Hen harrier at Epworth, 1560; Bittern near Epworth, 1562
Gregson, C. S.
Peregrine falcon breeding in Lancashire, 1846
Gunn, T. E.
Capture of an osprey in the North Sea, 1512; Peregrine falcon and merlin in Norfolk, Roughlegged buzzard in Suffolk, Great gray shrike in Norfolk, Piebald variety of the ring ouzel, 1513; Glossy ibis in Norfolk, Sandwich tern on the Norfolk coast, 1517; Little gull near Yarmouth, 1518; Otter in Suffolk, Roughlegged buzzards in Norfolk, 1598; Early nesting of the thrush, Piebald variety of the blackbird, White sky lark in confinement, 1599; Chocolate variety of the common starling, Offer of parasites from the gold pheasant, 1600; Parasitical worms in the stomach of a redbreasted merganser, Voracity of the common gull, 1603; Otter in Suffolk, 1719; Osprey in Norfolk, Early nesting of the barn owl in Norfolk, Cirl buntings and crossbills in Devonshire, Crossbills in Surrey, 1721; Curious malformed beaks of the wood pigeon and ringed plover, Vitality of a turkey, Purple sandpiper in Suffolk, Solitary snipe near Norwich, Velvet Scoter in Norfolk, 1722; Variety of the yellowhammer, Extraordinary jackdaw's nest, 1847; Unusual plumage of the nightjar, Ashcoloured wood pigeon, Piebald waterhen, Canada geese at Yarmouth, Redbreasted merganser, Contents of the stomach of a redthroated diver, 1848; beautiful variety of nightingale's eggs, Brambling breeding in confinement the second time, 1865; White sparrow in Norfolk, Green sandpiper on the Norfolk coast, 1866; Black swan on the Suffolk coast, 1867; Black tern's egg in Norfolk, 1868; Honey buzzard in Norfolk, 1917; Nest of blackbird with white nestlings, 1918; Abundance of landrails, 1920; Greenshank near Yarmouth, The cormorant inland, 1921; Notes on the Mammalia of Norfolk, 1925
Gurney, J. H., jun., F.Z.S.
List of the rarer birds obtained by Mr. Hart in the vicinity of Christchurch, Hants, 1510; Great gray shrike at Dover, 1513; Great black woodpecker in Leadenhall Market, 1515; Fulmar petrels at Scarborough, Fulmar petrel at Whitby, 1518; Correction of an error—Parasite of Sabine's snipe, 1562; Nyroca duck in Leadenhall Market; The longtailed duck, Longtailed duck near Lynn, Goosander near Bedale, 1563; Lesser kestrel near York, The black kite at Alnwick, 1598; Dartford warbler at Lyme Regis, Calandra lark near Exeter, 1599; Great crested grebe at Hempstead, in Norfolk, Great auks for sale, Food of the fulmar, 1603; Notes on the great auk, 1639; Bewick's swan at Flamborough, 1645; Firecrested regulus near St. Leonard's, 1683; Bridled guillemot at Bridlington, The great auk, 1684; Newts feeding on frog's spawn, 1685; Tengmalm's owl—correction of an error, 1799; Blacktailed godwit at Hickling, 1802; Crane at Tewkesbury, 1803; Occurrences of the crane in 1869, 1841; Position of birds in sleep, 1844; Missel thrush, 1846; Fulmar petrel

at Saltburn, 1868; Living birds sold at Moscow, 1916
HADFIELD, Captain HENRY
Ornithological notes from the Isle of Wight, 1545; Numbers of eggs laid by domestic hens, 1919; Nest and eggs of the corn crake, 1920
HAMEL, EGBERT D.
Cuckoo in confinement, 1722; Jackdaws, Nightjar at Heathfield Park, Sussex, 1928
HAMMOND, W. O.
Extraordinary flight of landrails, 1951
HART, W., and SON
Spoonbill at Benacre, Avocet at Portsmouth, 1562; Sabine's snipe (?) at Christchurch, 1722; Rare birds at Christchurch, 1917
HART, WILLIAM
Crane at Wareham, 1803
HARTING, J. EDMUND, F.Z.S.
Sooty tern at Wallingford, 1867
HEALY, CHARLES
A swarm of ladybirds, 1840
HEWITSON, W. C., F.L.S.
Early breeding of kingfisher, 1684
HORNE, CHARLES, B.C.S., F.Z.S.
Musk rat and frog, 1719; Note on the phosphorescence of the lobster after death, 1725; Flight of butterflies, moths, &c., 1767; Jottings on snakes, with an Appendix, &c., on snake poison and its reputed antidotes, 1809; Snake poison, and reputed antidotes for the same, 1870, 1889
HUGEL, The Baron A. DE
Ornithological notes from South Devon, 1720, 1846, 1917; The green lizard at Torquay, 1724; Rare bats at Torquay, 1768; Curious dentition in a rabbit, 1798; Variety of Anguis fragilis, 1836; Snowy owl in Ross-shire, 1863; Young thrasher in Torbay, 1922
HUNTER, JOHN
Merlin at Faversham, Golden Oriole near Faversham, 1513; Redthroated diver in Faversham Creek, Little auk and common guillemot at Faversham Creek, 1517; Kittiwake gull near Faversham, Pomarine skua and fork-tailed petrel near Faversham, 1518
KIRBY, H. T. MURDOCH
Name of a finch, 1721
LAST, T.
Variety of the robin, 1513
MARSH, O. C.
Observations on the metamorphosis of Siredon into Amblystoma, 1569
MATHEW, GERVASE F., R.N., F.L.S.
Late stay of swallows, 1516; Richard's pipit near Barnstaple, 1561; Night heron in Devonshire, 1802; Little gull, 1803; Swifts on the 15th of September at Sheerness, 1919
MATHEW, Rev. M. A., M.A.
Slaughter of sea-fowl at Weston-super-Mare, 1644; Dotterel near Weston, 1802
MAY, J. W.
Life-histories of sawflies, 1614, 1729, 1947
MONCREAFF, HENRY
Lacerta agilis oviparous, 1835
MOOR, Rev. E. C.
Late nesting of the stock dove, 1517; Chiffchaff's nest on a summer-house, Goldencrested wren nesting in ivy, 1918; Jackdaws and cows, Partridge sitting in September, Double hen's egg, 1919
MOOR, EDWARD J.
Sparrows fascinated by a snake, 1918
MOOR, G. W. P.
Nidification of woodpecker, 1515; Willow wren's nest in a quickset fence, 1918; Woodpecker laying twenty-two eggs, 1919
MOSLEY, Sir OSWALD, Bart., F.L.S.
Effect of cold on birds, 1845
MULLER, ALBERT
A contribution towards the life-history of Cecidomyia Persicariæ, 1705; Persistence of the scent of Aromia moschata, A hint respecting the Nematus-gall of Rhododendron ferrugineum, 1838; Nematus-gall on Rhododendron hirsutum, 1869; Acari parasitic on a Cecidomyia, 1922
MURTON, JAMES
The sparrowhawk, 1559; Pugnacity of the wren, 1644
NEWMAN, EDWARD, F.L.S., Z.S., &c.
The death of species, 1529, 1784; Collected observations on British reptiles, 1593, 1617, 1649, 1707, 1826, 1929; Curious malformation in a gull's leg, 1685; The plague of sparrows, A baby dove incubating, 1866
NICHOLLS, HENRY, jun.
Cuckoo in a swallow's nest, Crane on the Devon coast, 1866; Fox shark off the Slapton Sands, 1869
NORMAN, GEORGE
Great spotted woodpecker in Morayshire, 1515

POWER, F. D.
Notes at Rainham, Kent, and neighbourhood, 1496
PRESTON, Rev. T. A., M.A.
Rednecked phalarope at Marlborough, Winter puffin at Marlborough, 1951
RANSON, J.
Nest of the redstart, Arrivals of summer migrants near York, 1801
REEKS, HENRY, F.L.S., Z.S.
Notes on the Zoology of Newfoundland, 1609, 1689, 1741, 1849
RICKARDS, M. S. C.
Pomarine skua at Exmouth, 1518; Purple sandpiper at Weston-super-Mare, 1645
ROBERTS, GEORGE
Otter near Wakefield, 1682; Nightingale in Yorkshire, 1800; Notes on migratory birds, 1844
ROBERTS, T. VAUGHAN
Ring ouzel in Kensington Gardens, 1800
RODD, EDWARD HEARLE
Dartford warbler near Truro, 1560; Great black woodpecker in Hants, unauthenticated, 1562; Hoopoes in the Land's End district, 1722; The seasonal plumage of the divers (Colymbidæ), 1723; Golden oriole at Scilly, 1800; Night herons in Cornwall, 1802; Ring ouzel in Cornwall and Devon, 1917; American stint at Northam Burrows, 1920; Dartwarbler at St. Buryan, near Penzance, Little bustard on the Lizard Land, 1951
ROGERS, HENRY
Natural-History notes from Rio, 1923
ROWLEY, GEO. DAWSON, M.A., F.L.S.
White woodcock, The skins of Alca impennis, 1645; The water and rock pipits, 1682; Contents of a heron's crop, 1722
SAXBY, H. L., M.D.
Ornithological notes from Shetland, 1760
SIDEBOTHAM, JOSEPH
Varieties in Lepidoptera, 1952
SKINNER, A.
Common buzzard at Boughton, near Faversham, Roughlegged buzzard near Faversham, 1559; Hawfinches near Faversham, Crossbills near Faversham, Variety of the rook, 1561; Great spotted woodpecker near Faversham, Lesser spotted woodpecker at Faversham, Variety of the common pheasant, 1562; Pintailed duck near Faversham, Sclavonian grebe near Faversham, 1563; Kittiwake gull in Faversham Creek, 1564
SMEE, A. H.
Kittiwake gulls on the Thames, 1645; Migration of wood pigeons, 1683; Redcrested merganser on the Thames, 1684; Cuckoo in the City, 1802; Greenshank and lesser tern at Leigh, 1921
SMITH, CECIL
Common crossbill near Taunton, 1514; Ornithological notes from South Devon, 1845; Robin and wigeon breeding in confinement, 1865
SMITH, WALTER
Ring ouzel at Muswell Hill, 1721
SOUTHWELL, THOMAS
Note on the nest of Podiceps minor, 1803
STEVENSON, E.
Hybrid between Bactrian camel and dromedary, 1682
STEVENSON, HENRY, F.L.S.
Ornithological notes from Norfolk, 1490, 1908; Cranes in Norfolk, 1803; Golden eagle in Norfolk, 1863
STUBBS, CHARLES E.
Great gray shrike at Henley-on-Thames, 1560; Land and freshwater mollusks collected in the immediate neighbourhood of Henley-on-Thames during the season of 1868, 1836; Ornithological notes from Henley-on-Thames, 1916
SWEETAPPLE, EDWARD
"London cod" in the Severn, Large eel in the Severn, 1520; Sturgeons in the Severn, 1836
THOMASSON, JOHN P.
Blue tit's nest inside a thrush's nest, 1802
THOMPSON, R.
Two tiger stories and one elephant story, 1769
VERNER, W. W.
Variety of birds' eggs, 1844
WALKER, THEODORE C.
Curious position of nest of waterhen, Anecdote of owls, 1723
WALLIS, H. M.
Pomarine skua at Aldeburgh, 1868
WALSH, W. H.
Martins and swallows, 1802
WATSON, J.
Scoter breeding in Strathmore, 1867

WEIR, J. JENNER, F.L.S.
Lacerta agilis sometimes oviparous, 1665
WONFOR, T. W.
Whitetailed eagle in Sussex, 1512; Firecrested regulus at Brighton, Richard's pipit at Brighton, 1513; Peregrine falcon in Sussex, 1559; Dwarf meadow pipit, Variety of the brown linnet at Brighton, Crossbills in Sussex, 1561; Little gull at Brighton, 1563; Peregrine falcon near Brighton, 1598; Little gulls in Sussex, 1603; Richard's pipit, Meadow pipits, Pied jay, 1683; Red-throated diver, 1684; Flycatcher and wren building their nests together, 1799; Dartford warbler's nest with five eggs, Redpole building in Brighton, 1801; Variety of the wheatear, Tawny pipit near Brighton, Rosy bullfinch and Richard's pipit at Brighton, 1918; Hoopoe near Brighton, 1919; Gray phalarope in Sussex, 1920; Little gull at Brighton, 1921
WRIGHT, CHARLES
About shells, 1700
WRIGHT, JOHN
Summer duck at Lymington, 1563; Black swan, &c., on the Solent, 1602

ALPHABETICAL LIST OF SUBJECTS.

Acari parasitic on a Cecidomyia, 1922
Alca impennis, the skins of, 1645
Alcedinidæ, 1692
Alcidæ, 1854
Amblystoma, observations on the metamorphosis of Siredon into, 1569
Anatidæ, 1753
Anecdote of owls, 1723
Anguis fragilis, 1649; variety of, 1836
Animals, marine, in fresh water, 1764; wild, eating porcupines, 1842
Ant, sugar-cane, 1790
Aphides, plague of, 1839; seen at sea, *id.*; in Lincolnshire, *id.*
Ardeidæ, 1748
Aromia moschata, persistence of the scent of, 1838
Arrivals, spring, 1861
Auk, little, at Faversham Creek, 1517; at Loughton, 1867; great, notes on the, 1639, 1684, 1854; razorbilled, 1856; little, 1857
Auks, great, for sale, 1603
Avocet at Portsmouth, 1562; near Pembroke, 1677
Badger, 1926
Bat, barbastelle, at Salisbury, 1558
Bats, rare, at Torquay, 1768
Bee-eater, 1675, 1696
Bees devoured by toads, 1869
Bird, king, 1692; blue, 1693; oven, 1694; American butcher, 1742; yellow or thistle, 1743; snow, 1744
Bird murder, 1512
Birds, rarer, obtained in the vicinity of Christchurch, Hants, 1510, 1917; rare, in the Highlands, 1519; rarer, noticed in Suffolk in 1868, 1695; rare, killed in the Trent district, North Lincolnshire, 1739; shore and sea, 1843; migratory, 1844; position of in sleep, *id.*; effect of cold on, 1845; living, sold at Moscow, 1916; effects of inclement and unseasonable weather on, 1917; rare, near Hastings, 1950
Birds' nests, early, 1603; eggs, varieties of, 1844; nests, variety of in one garden, 1868
'Birds of Sherwood Forest; with Notes on their Habits, Migration, &c.,' 1881
Bittern, 1491, 1494, 1495, 1496, 1676; near Epworth, 1562; at Looe, *id.*; American, in Ireland, 1517; in Newfoundland, 1748; little, 1676
Blackbird, piebald variety of, 1599; crow, a robber, 1603; crow, 1744; rusty, *id.*; nest of with white nestlings, 1918
Blackcap, 1497
Blind-worm, 1649
Brambling, 1497, 1698; breeding in confinement the second time, 1865
Bream-fishing in the Yare, 1520
Bufo viridis, 1714
„ vulgaris, 1826
Bullfinch, rosy, at Brighton, 1918
Bullock, tigers repulsed by a, 1769
Bungarus lineatus, 1899
Bunting, snow, 1495, 1543, 1697, 1743;

blackheaded, 1599, 1674; yellow, 1698, 1860; cirl, in Devonshire, 1721; painted, in Oxfordshire, 1865
Bustard, little, on the Lizard Land, 1951
Butterflies, moths, &c., flight of, 1767
Buzzard, 1671; roughlegged, 1496, 1697, 1908; in Suffolk, 1513; near Faversham, 1559; in Norfolk, 1598; common, near Faversham, 1559; honey, in Norfolk, 1917
Camel, Bactrian, and dromedary, hybrid between, 1682
Carthaginians, 1537
Cecidomyia, Acari parasitic on a, 1922
Cecidomyia Persicariæ, a contribution towards the life-history of, 1705
Certhiadæ, 1742
Cetoniadæ and Lucanidæ, 1581
Chaffinch, 1497, 1674; fastens its nest with saliva on the top of posts when sawn off perfectly smooth, 1884; cream-coloured variety of, 1720
Chaffinches, sexes of, 1514; young, in nestling plumage, 1561
Channel Islands, rough notes from the, 1588, 1630
Charadridæ, 1748
Chelonia, 1595
Chiffchaff's nest on a summer-house, 1918
Chough, 1674
Cimbex connata, 1729
Clark, Rev. Hamlet, 'Letters Home,' 1580
Cobra, curious habit of the, 1818; bite of to prove effective, 1876
Coluber austriacus, 1653
„ Natrix, 1651
Colubridæ, 1651
Colymbidæ, 1852; seasonal plumage of, 1723
Coot, 1677; American, 1753
Cormorant, 1509, 1681, 1852; double-crested, 1852; inland, 1921
Cormorants of Dublin Bay, 1509
Corvidæ, 1744
Cows and jackdaws, 1919
Crake, corn, nest and eggs of, 1920
Crane, 1763, 1910; at Lynn, 1803; at Tewkesbury, *id.*; at Wareham, *id.*; occurrences of the, in 1869, 1841; on the Devon coast, 1866
Cranes in Norfolk, 1803
Creeper, black and white, 1693; American, 1742
Crocodiles, 1617
Crossbill, 1492, 1493, 1494, 1496, 1546, 1674, 1698, 1760, 1909; near Taunton, 1514; parrot, 1700; American, 1743; whitewinged, *id.*
Crossbills near Faversham, 1561; in Sussex, *id.*; in Surrey, 1721; in Devonshire, *id.*
Crow, hooded, 1498, 1736, 1860, 1912; carrion, 1674; American, 1744
Crustaceans, 1555
Cuckoo, 1721; in confinement, 1722; in the City, 1802; late singing of, 1847; in a swallow's nest, 1866; the female cries, 1887; arrival of in February, 1888
Cuckoo—the egg question, 1545
Curlew, 1677; stone, 1696, 1738; Esquimaux, 1752; Hudsonian, *id.*; long-billed, *id.*
Cypselidæ, 1692
Daboia elegans, 1900
Death's head and the bees, 1913
Deer, fallow, 1927
Dipper, 1909
Diver, redthroated, 1494, 1546, 1679, 1684, 1720, 1910, 1853; in January, 1499; in perfect summer plumage in October, 1500; on the autumn moult of adults, *id.*; independent flight, 1501; deglutition, 1502; in Faversham Creek, 1517; contents of the stomach of, 1848; great northern, 1503, 1545, 1679, 1852; numerous off the Dublin coast in the winter of 1866-7, 1503; in breeding plumage in October, *id.*; blackthroated, 1504; at St. Leonard's, 1684; northern, 1697
Divers, blackthroated, probability that there are two kinds of, 1507; seasonal plumage of, 1723
Dotterel, 1491, 1492, 1739; near Weston, 1802; ringed, 1841
Dove, stock, late nesting of, 1517; in North Lincolnshire, 1668; turtle, 1675, 1861, 1911; ring, 1676; a baby incubating, 1866
Dromedary and Bactrian camel, hybrid between, 1682
Duck, longtailed, 1495, 1563, 1678, 1700, 1757, 1909; near Lynn, 1563; pintailed, near Faversham, *id.*; in South Devon, 1720; Nyroca, in Leadenhall Market, 1563; summer, at Boultibrook, *id.*; at Lymington, *id.*; ice, 1668; scaup, 1668, 1736, 1756; eider, 1678; redcrested whistling, *id.*; tufted, 1678, 1911; wild, 1736, 1755; variety of, 1906; hybrid, 1907; black, 1755; gray, *id.*; pintail, 1755, 1909; American scaup, 1756; buffelheaded, *id.*; harlequin, *id.*; ringnecked, *id.*; American

eider, 1758; Labrador, *id.*; surf, *id.*; velvet, *id.*; ruddy, 1759; garganey, 1912
Dunlin, 1668; American, 1750
Eagle, sea, 1490, 1909; whitetailed, in Suffolk, 1512, 1558, 1699; bald or whiteheaded, 1613; golden, in Norfolk, 1863; at Sherwood, 1881
Eagles, whitetailed, 1760
Echis Garmina, 1900
Eels, conger, in the Thames, 1520
Egg of black tern in Norfolk, 1868; of hen, double, 1919
Eggs, of cuckoo, 1545; birds', varieties of, 1844; of Dartford warbler, 1847; nightingale's, beautiful variety of, 1865; of woodpecker, 1919; number of laid by domestic hens, *id.*; of corn crake, 1920
Egyptians, 1536
Eider, king, 1759
Elephant and the railway, 1608; dimensions of large, 1916
Elephant preserving, 1557; female, carrying her young, 1774
Emys lutaria, 1596
Entomological Society, proceedings of, 1520, 1564, 1605, 1646, 1685, 1726, 1804
Entomology, on the application of the law of priority to genera in, 1523
Falcon, peregrine, 1489, 1494, 1496, 1670, 1763, 1846, 1909; in Norfolk, 1513; at Epworth, 1559; in Sussex, *id.*; in Kent, 1598; near Brighton, *id.*; breeding in Lancashire, 1846; at Spurn, 1946; Greenland, 1611; Iceland, 1695
Falconidæ, 1610
Feathered friends, our, 4845
Fieldfare, 1497, 1543, 1669, 1736
Fieldfare's nest at Alresford, 1864
Finch, name of a, 1721; pine, 1743; serin, at Worthing, 1865
Finches, mountain, 1720
Flicker, 1692
Flies, fire, 1580
Flycatcher, 1497; and wren building their nests together, 1799; pied, 1492, 1671, 1862; in Kent, 1599; least, 1692; greencrested, 1693; yellowbellied, *id.*; Canada, 1694; green black-cap, *id.*; spotted, 1740; yellowthroated, 1742
Formica saccharivora, 1790
Fowl, sea, preservation of, 1632; slaughter of, at Weston-super-Mare, 1644; wild, 1699, 1908, 1858
Fox, white, in North Wales, 1558
Fringillidæ, 1742
Frog, common, 1929; and musk rat, 1719
Frogs and toads, 1714
Frog's spawn, newts feeding on, 1685
Fulmar, food of, 1603, 1761
Gadwall, 1678, 1755
Galatea Andrewsii at Penzance, 1604
Gannet, 1546, 1720, 1763, 1852; in Leicestershire, 1921
Gannets at East Looe, 1517
Geese, Canada, at Yarmouth, 1848
Godwit, bartailed, 1677, 1736, 1741, 1861; Hudsonian, 1752; marbled, *id.*; blacktailed, at Hickling, 1802, 1910
Goldeneye, 1668, 1678, 1697, 1698, 1762; American, 1756
Goldcrests, abundance of, 1720
Goldfinch in Kent, 1600
Goosander, 1678, 1759, 1908; near Bedale, 1563
Goose, pinkfooted, 1489; brent, 1699, 1754; American whitefronted, 1753; Canada, *id.*; snow, *id.*
Goshawk, 1700; American, 1611
Grampus, 1927
"Gray Gull," extracts from the Log of the, 1499
Grebe, Sclavonian, 1489, 1495, 1496, 1679, 1760, 1909; near Faversham, 1563; greatcrested, 1490, 1678; at Hempstead, in Norfolk, 1603; rednecked, 1678; eared, 1679
Greeks, 1538
Greenfinch, 1761, 1909
Greensbank, 1493, 1498, 1677; at Leigh, 1921; near Yarmouth, *id.*
Grosbeak, American pine, 1742
Grouse, Canada, 1745; willow, 1746
Gruidæ, 1747
Guillemot, common, 1679, 1737, 1857; at Faversham Creek, 1517; black, 1857; thickbilled, *id.*; ringed, 1681; bridled, at Bridlington, 1684
Gull, blackheaded, 1491, 1499; little, 1495, 1803, 1908; near Yarmouth, 1518; at Brighton, 1653, 1921; at Looe, 1563; in Sussex, 1603; kittiwake, 1681, 1851; near Faversham, 1518; in Faversham Creek, 1564; Iceland, in Kingstown Harbour, County Dublin, 1564; common, 1862; voracity of, 1603; brownheaded, 1668, 1841, 1905; lesser blackbacked, 1681, 1907; herring, 1681; glaucous, 1846, 1850; great blackbacked, 1850; ringbilled, *id.*; whitewinged, *id.*; Bonaparte's, 1851; ivory, *id.*; Sabine's, *id.*; brownhooded, 1859, 1861; skua, 1917

Gull's leg, curious malformation in a, 1685
Gulls, glaucous and Iceland, in Kingstown Harbour, County Dublin, 1517; kittiwake, on the Thames, 1645; herring, 1858
Hæmatopidæ, 1748
Hare, pied, in Suffolk, 1558
Harrier, Montagu's, 1490, 1910; hen, 1495, 1671, 1912; at Epworth, 1560; American hen, 1612; marsh, 1671
Harriers, 1911
Hawfinch, 1490, 1497, 1695, 1911, 1912
Hawfinches near Faversham, 1561
Hawk, pigeon, 1610; American sparrow, 1611; Cooper's, *id.*; redtailed, *id.*; sharpshinned, *id.*; black, 1612; fish, 1613; sparrow, 1670; American night, 1692
Hedgehog, 1926
Hedgesparrow, 1545, 1761
Hen, moor, creamcoloured, 1601; water, curious position of nest of, 1723; piebald, 1848
Hen's egg, double, 1919
Hens, domestic, number of eggs laid by, 1919
Heron, night, 1676, 1860, 1862; in Cornwall, 1802; in Devonshire, *id.*
Heron's crop, contents of, 1722
Hirundinidæ, 1694, 1741
Hobby, 1912; orangelegged, 1491
Hoopoe, 1491, 1675, 1696, 1739; near Brighton, 1919
Hoopoes at the Land's End district, 1722
Hybrid between Bactrian camel and dromedary, 1682
Ibis, glossy, 1493, 1677, 1917; in Norfolk, 1517
Icteridæ, 1744
Insect-hunting grounds, Irish, 1549
Insects, resinous sap attractive to, 1582
Jackdaw, 1545; extraordinary nest of, 1847; nests of, 1928
Jackdaws and cows, 1919
Jay, pied, 1683; blue, 1745; Canada, *id.*
Kestrel, lesser, near York, 1598; near Norwich, 1912
Kingfisher, 1498, 1666, 1675, 1905; early breeding of, 1684; belted, 1692
Kingfishers, 1696
Kite, 1671; black, at Alnwick, 1598
Knot, 1498, 1677, 1699, 1750, 1906; in summer plumage at Spurn, 1946
Lacerta agilis, 1624; sometimes oviparous, 1835
Lacerta Stirpium, 1622
„ viridis, 1619
Ladybirds, a swarm of, 1840; the last of the, 1922
Landrail, 1499, 1912
Landrails, abundance of, 1920; extraordinary flight of, 1591
Laniidæ, 1742
Lapwing, 1676, 1841, 1906
Laridæ, 1849
Lark, shore, in captivity, 1513; sky, white, in confinement, 1599; Calandra, near Exeter, *id.*; American tit, 1693; sky, albino, 1699; sky, nests of, 1912
Lemming, 1795
Lepidoptera, varieties in, 1952
'Letters Home,' 1580
Linnet, brown, variety of at Brighton, 1561
Liotrichidæ, 1742
Lizard, green, 1619; at Torquay, 1724; sand, 1622; common, 1624
Lobster, phosphorescence of after death, 1725
Locust-killer, 1604
Locust, migratory, 1788
"London cod" in the Severn, 1520
Loricata, 1617
Mallard, 1755
Mammalia of Norfolk, notes on, 1925
Martin, 1545; sand, 1492, 1695; bee, 1692; house, 1740; purple, 1741; sand, albino, 1847
Martins, late stay of, 1516; scarcity of in 1868 in the neighbourhood of East Looe, *id.*; and swallows, 1802, 1862
Merganser, redbreasted, 1678, 1699, 1759, 1848; parasitical worms in the stomach of, 1603; redcrested, on the Thames, 1684; hooded, 1759
Merlin, 1494, 1496, 1670, 1695, 1910; in Norfolk, 1513; at Faversham, *id.*; near Epworth, 1559
Migrants, summer, arrivals of near York, 1801
Migration, 1784
Mole, 1926
Mollusks, land and fresh-water, 1836
Mouse or spider, 1719
'Mysteries of the Ocean,' 1552
Naia tripudians, 1898
Natterjack, 1714
Natural-History notes from Rio, 1923
Naturalists' Book Agency, 1512
Nematus aurantiacus, 1614
„ Betulæ, 1947
Nematus-gall of Rhododendron ferrugineum, 1838; on Rhododendron hirsutum, 1869
Nest of woodcock, 1490; of woodpecker, 1515; of stock dove, late, 1517; of

partridge in January, 1600; of robin, early, 1720; of missel thrush, early, *id.*; late, 1861; of barn owl, early, 1721; of water hen, curious position of, 1723; of wren with a flycatcher's built on the top of it, 1799; of redstart, 1801; of Dartford warbler, with five eggs, *id.*; of redpole, *id.*; of blue tit inside a thrush's, 1802; of little grebe, 1803; of jackdaw, extraordinary, 1847; of fieldfare, 1864; of swallow, cuckoo in, 1866; of blackbird, with white nestlings, 1918; of willow wren in a quickset fence, *id.*; of chiffchaff on a summer-house, *id.*; of goldencrested wren in ivy, *id.*; of corn crake, 1920
Newts feeding on frog's spawn, 1685
Nightingale in Yorkshire, 1800; late singing of, 1847; beautiful variety of eggs of, 1865
Nightjar, 1675; unusual plumage of, 1848; in October, 1919; at Heathfield Park, Sussex, 1928
Nuthatch, redbellied, 1742
Ophidia, 1650
Oriole, golden, near Faversham, 1513; at Scilly, 1800; in Suffolk, 1861; in Kent, 1864; near Horsham, *id.*; in Norfolk, 1911
Ornithological notes from Norfolk, 1489, 1908; at Rainham, Kent, and neighbourhood, 1496; from the County Dublin for 1867, 1499; from North Lincolnshire, 1543, 1666, 1736, 1840, 1905; from Pembrokeshire, 1670; from South Devon, 1720, 1845, 1846, 1917; from Shetland, 1760; from Stirlingshire, 1799, 1950; from Suffolk, 1858; from Henley-on-Thames, 1916
Osprey, 1493, 1697; in the North Sea, capture of, 1512; at Epworth, 1559; in Norfolk, 1721; American, 1613
Otter near Wakefield, 1682; in Norfolk, 1926
Otters in Suffolk, 1557, 1598, 1719
Ouzel, ring, 1494, 1671. 1697; at Muswell Hill, 1721; in Kensington Gardens, 1800; in Cornwall and Devon, 1917; piebald variety of, 1513
Owl, shorteared, 1543, 1698; American barn, 1614; great horned, *id.*; scops eared, 1671; American longeared, 1689; American shorteared, *id.*; barred, *id.*; mottled or American screech, *id.*; saw-whet, *id.*; snowy, 1689, 1763; in Ross-shire, 1863; sparrow, 1689; hawk, 1691; barn, early nesting of, in Norfolk, 1721; longeared, 1762; Tengmalm's, 1799; white, on Bishopsgate Church, 1846; eagle, capture of in Norfolk, 1863; white, hoots but seldom screams, 1882; tawny, screeches but rarely if ever hoots, *id.*; eagle, 1913
Owls, anecdote of, 1723
Oystercatcher, 1676, 1763
Parasites, bird, notes on, 1583; from the gold pheasant, offer of, 1600
Paridæ, 1742
Partridge, 1545, 1666; containing egg in winter, 1600; sitting in September, 1919; French, 1489, 1494; spruce, 1745
Partridges nesting in January, 1600; white (? ptarmigan) near Ganton, Yorkshire, 1951
Pastor, rosecoloured, 1492, 1866
Peewits, 1861
Pelias Berus, 1660
Petrel, storm, 1495; forktailed, 1681; near Faversham, 1518; fulmar, 1849; at Scarborough, 1518; at Whitby, *id.*; at Saltburn, 1868; Leach's, 1849; stormy, *id.*; Wilson's stormy, *id.*
Pewee, 1692; wood, *id.*
Phalacrocoracidæ, 1852
Phalarope, gray, 1677, 1698; in Sussex, 1920; red, 1749; rednecked, in the neighbourhood of Plymouth, 1920; at Marlborough, 1951
Phalaropidæ, 1749
Pheasant containing egg in January, 1600
Pheasant, pied, 1495; common, variety of, 1562; gold, offer of parasites from the, 1600
Picidæ, 1691
Pigeon, wood, 1666; with curious malformed beak, 1722; passenger, 1791; wood, ashcoloured, 1848; Cape, 1921
Pigeons, wood, immigration of, 1496; extraordinary migration of, 1600, 1683
Pipit, rock, 1194, 1497, 1674; Richard's, at Brighton, 1513, 1918; near Barnstaple, 1561; near Brighton, 1683; meadow, dwarf, 1561; tawny, near Brighton, 1918
Pipits, water and rock, 1682; meadow, 1683
Plover, golden, 1498, 1544, 1669, 1736; on the variation in colour of the axillary plume of, 1601; gray, 1498, 1697, 1740, 1906; ringed, 1676, 1862; with curious malformed beak, 1722; American golden, 1748; blackbellied or gray, *id.*; piping, *id.*; ring or semipalmated, *id.*; Kentish, 1862, 1911; killdeer, 1748
Pochard, 1678; white-eyed, 1490

Podiceps minor, note on the nest of, 1803
Polecat, 1925
Porcupines, tigers eating, 1769; wild animals eating, 1842
Poultry-yard in India, daugers to the, 1810
Pratincole, 1492
Procellariidæ, 1849
Ptarmigan, rock, 1747
Puffin, 1490, 1681, 1909, 1857; winter, at Marlborough, 1951
Quail, 1491, 1676, 1761
Quails, 1695
Rabbit, curious dentition in a, 1798; abnormal dentition in the, 1843; variety of, 1927
Races, human, on the decay of those which inhabit the shores of the Mediterranean, 1529
Rail, water, 1677; spotted, 1697; common American, 1752; Virginian, *id.*
Rana temporaria, 1929
Ranidæ, 1714
Rat, musk, and frog, 1719; variety of, 1926
Raven, 1498, 1547, 1674, 1846; American, 1744
Razorbill, 1545, 1681, 1846
Redpole building in Brighton, 1801
Redpole, lesser, 1600; mealy, 1600, 1743
Redshank, 1677, 1695, 1696, 1906, 1860, 1862; spotted, 1946
Redstart, 1545, 1671; nest of, 1801; black, 1672, 1898, 1699; builds in quickset hedges by the side of the road near Ollerton, 1883; American, 1694
Redwing, 1497
Regulus, firecrested, at Brighton, 1513; near St. Leonard's, 1683
Reptiles, British, collected observations on, 1593, 1617, 1649, 1707, 1826, 1929; immutable, 1595; metamorphotic, 1707; early appearance of, 1724
Rhinoceros horn toppling forward, 1915
Rhododendron ferrugineum, a hint respecting the Nematus-gall of, 1838
,, hirsutum, Nematus-gall on, 1869
Robin, variety of, 1513; sitting in December, 1560; at fault, 1604; American, 1644, 1693; early nesting of, 1720; breeding in confinement, 1865
Rook, 1546, 1763, 1910, 1885; variety of, 1561, 1906
Rooks and rookeries, 1514
Romans, 1538
Salmon, a monster, 1836
Sanderling, 1676, 1750
Sandpiper, purple, 1495, 1677, 1750; at Weston-super-Mare, 1645; in Suffolk, 1722; green, 1498, 1677, 1697, 1858; on the Norfolk coast, 1866; common, 1677; Bonaparte's, 1750; least, *id.*; Bartram's, 1751; semipalmated, *id.*; solitary, *id.*; spotted, *id.*; stilt, *id.*; yellow-shanked, *id.*; buffbreasted, 1752; curlew, at Spurn, 1946
Sapsucker, 1691
Saurians, 1618, 1649
Sawflies, life-histories of, 1614, 1729, 1947
Scincoideæ, 1649
Scolopacidæ, 1749
Scoter, common, 1678, 1698, 1841; breeding in Strathmore, 1867; velvet, 1722, 1902; American, 1758
Scyllarus arctus in berry, 1725
Shag, 1681
Shark, fox, off the Slapton Sands, 1869
Shearwater, Manx, 1861, 1761, 1849; cinereous, 1720; greater, 1849; sooty, *id.*
Shellducks, 1489
Shells, about, 1700
Shieldrake, common, 1678, 1698; ruddy, 1910
Shooting punt, a tale from a, 1504
Shoveller, 1678, 1739, 1755, 1909, 1910, 1912
Shrike, great gray, 1494, 1495; at Dover, 1513; in Norfolk, *id.*; at Henley-on-Thames, 1560; great northern, 1742; redbacked, 1861; each species of nests near Lee, 1883
Sibyllina, on the affinities of the genus, 1566
Siredon into Amblystoma, observations on the metamorphosis of, 1569
Siskins, 1762, 1885
Skua, 1499; pomarine, at Exmouth, 1518; near Faversham, *id.*; at Aldeburgh, 1868; Richardson's, 1697; arctic, 1850; Buffon's, *id.*
Slow-worm, 1649
Smew, 1678
Snake, common, 1651; lizard, 1653; sparrow fascinated by a, 1918
Snake-poison and its reputed antidotes, 1809, 1870, 1889; the poison very soon becomes exhausted by frequent biting, 1876; antidote for, 1879; experiments, 1889, 1900, 1903
Snake-stone, no truth in the virtue attributed to the, 1877
Snakes, jottings on, 1809
Snipe, 1498, 1861; and woodcocks,

1496; great, 1492; jack, 1696, 1736, 1861; Sabine's, parasite of, 1562; solitary, near Norwich, 1722; Sabine's (?), at Christchurch, 1722; American jack, 1750; gray, *id.*; robin, *id.*; Wilson's, *id.*; stone, 1751
Sparrow, tree, 1497, 1543, 1736; in Kent, 1599; whitethroated, in Aberdeenshire, 1547; pied, 1697; house, 1698, 1858; variety of, 1720; chipping, 1744; fox-coloured, *id.*; Savannah, *id.*; whitecrowned, *id.*; whitethroated, *id.*; white, 1860; in Norfolk, 1866
Sparrows, young, in December, 1599; the plague of, 1866; fascinated by a snake, 1918
Sparrowhawk, 1559
Species, the death of, 1529, 1784
Spider or mouse, 1719
Spoonbill, 1490, 1677; at Benacre, 1562; at Scilly, 1848
Spring arrivals, 1861
Spurn Point, notes from, 1942
Squirrel, 1926
Starling, 1907; common, chocolate variety of, 1600; albino, 1763
Sterland, J. W., 'The Birds of Sherwood Forest, 1881
Stint, little, 1490, 1491, 1697, 1912; American, at Northam Burrows, 1920
Stoat, 1925
Stork, common, 1699; in Holderness, 1946
Strigidæ, 1614, 1689
Sturgeons in the Severn, 1836
Sulidæ, 1852
Swallow, 1498, 1545, 1721; late, 1562; American chimney, 1692; barn, 1694; cliff, *id.*; bank, 1695; whitebellied, *id.*
Swallow's nest, cuckoo in a, 1866
Swallows, late stay of, 1516; and martin's, 1802, 1862
Swan, black, on the Solent, 1602; on the Suffolk coast, 1867; Bewick's, at Flamborough, 1645; American, 1753; wild, 1909
Swift, 1675, 1696, 1907, 1861
Swifts on the 15th of September at Sheerness, 1919
Sword-fish, 1556
Sylvicolidæ, 1693
Teal, 1666; garganey, 1739; blue-winged, 1755; greenwinged, *id.*
Tern, black, 1490, 1499, 1696; egg of in Norfolk, 1868; Sandwich, 1494; on the Norfolk coast, 1517; common, 1499; lesser, *id.*; at Leigh, 1921; Caspian, 1851; Wilson's, *id.*; arctic, 1852, 1914; least, 1852; sooty, at Wallingford, 1867
Terns at East Looe, 1517; in Suffolk, 1862
Tetraonidæ, 1745
Thalassites, 1556
Thrasher, young, in Torbay, 1922
Thrush, 1546, 1907; blackthroated, near Lewes, 1560; song, early nesting of, 1599; hermit, 1693; migratory, *id.*; olivebacked, *id.*; Wilson's, *id.*; goldencrowned, 1694; missel, early nesting of, 1720; at Tottenham, 1846; late nesting of, 1861
Tiger, a cannibal, 1771
Tigers repulsed by a bullock, 1769; eating porcupines, *id.*
Tit, Hudsonian, 1742; blue, nest of inside a thrush's nest, 1802; great, rare variety of, 1847
Titmouse, blackcap, 1742
Tits and their food, 1927
Toad, 1826
Toads devouring bees, 1869
Tortoise, freshwater, 1596
Tortoises, 1595
Turdidæ, 1693
Turkey, vitality of a, 1722
Turnstone, 1491, 1748, 1761, 1911
Twite, 1497
Twites, 1697
Tyrannidæ, 1692
Varieties of birds' eggs, 1844; in Lepidoptera, 1952
Variety of birds' nests in one garden, 1868; of ring ouzel, 1513; of robin, *id.*; of brown linnet, 1561; of rook, 1561, 1906; of common pheasant, 1562; of blackbird, 1599; of sky lark, *id.*; of starling, 1600; of moor hen, 1601; of woodcock, 1602, 1645; of jay, 1603; of sparrow, 1720, 1858, 1860, 1866; of chaffinch, *id.*; of Anguis fragilis, 1836; of great tit, 1847; of yellowhammer, *id.*; of sand martin, *id.*; of water hen, 1848; of wild duck, 1906; of nightingale's eggs, beautiful, 1865; of wheatear, 1918; of rat, 1926; of rabbit, 1927
Viper, 1660
Viperidæ, *id.*
Visitors, spring, dates of arrival of in North Lincolnshire, 1723
Wagtail, gray, 1497; in Kent, 1599; yellow, 1497, 1695; pied, 1669, 1673; white, 1669; Ray's, 1673; at Scilly, 1847
Warbler, Dartford, near Truro, 1560;

in Jersey, *id.*; at Lyme Regis, 1599; nest of, with five eggs, 1801; number of eggs laid by, 1847; in St. Buryan, near Penzance, 1951; grasshopper, 1673; sedge, *id.*; baybreasted, 1694; black and yellow, *id.*; blackpoll, *id.*; blackthroated green, *id.*; chestnut-sided, *id.*; Nashville, *id.*; yellow, *id.*; yellow red-poll, *id.*; yellowrumped, *id.*; blackcap, 1911
Warblers, early singing of, 1721
Waterfowl, the, in St. James's Park, 1519
Waxwing, Bohemian, 1673
Wheatear, 1545, 1672, 1840; variety of, 1918
Whimbrel, 1498, 1697, 1739, 1841, 1906, 1861
Whinchat, 1672
Whitethroat, 1545
Wigeon, 1666; breeding in confinement, 1865; American, 1756; English, *id.*
Willet, 1750
Woodchat in Kent in 1868, 1863
Woodcock, 1543; buffcoloured, 1602; white, 1645; black, or log cock, 1692; European, 1749; American, 1750
Woodcock's nest, 1490
Woodcocks and snipe, 1496
Woodpecker, nidification of, 1515; laying twenty-two eggs, 1919
Woodpecker, great spotted, 1490, 1491, 1492, 1494, 1495, 1496, 1695, 1700, 1761, 1861, 1911; in Morayshire, 1515; near Faversham, 1562; great black, 1515; in Leadenhall Market, *id.*; in Hampshire, 1516, 1562; lesser spotted, at Faversham, 1562; banded threetoed, 1691; blackbacked threetoed, *id.*; downy, *id.*; hairy, *id.*; lesser spotted, 1696; green, 1886
Worms, parasitical, in the stomach of a redbreasted merganser, 1603
Wren, pugnacity of, 1644; rubycrowned, 1693; goldcrested, 1736; winter, 1742; and flycatcher building their nests together, 1799; willow, nest of in a quickset fence, 1918; goldencrested, nesting in ivy, *id.*
Wrens, abundance of, 1720
Yellowhammer, variety of, 1847
Yellowthroat, Maryland, 1694
Zonotrichia albicollis, 1547
Zoological Society, extracts from the Report of the Council of, 1775
Zoology of Newfoundland, 1609, 1689, 1741, 1849; of the Swedish arctic exploration, 1766
Zootoca *v.* Lacerta, 1868

THE ZOOLOGIST

FOR

1869.

Ornithological Notes for Norfolk from February to December, 1868.

By Henry Stevenson, Esq., F.L.S.

(Continued from Zool. S. S. 1128).

February.

Sclavonian Grebes.—Two adult birds killed near Stiffkay on the 14th.* Another bird of this species was also killed at Weyborne on the 30th of January.

Pinkfooted Goose.—On the 25th I purchased a fine specimen in our fish-market, shot somewhere in the Broad district.

March.

Shellducks.—On the 3rd of this month Mr. J. H. Gurney observed eleven of these ducks in Leadenhall Market, and was informed by the dealer that he had had twelve, six from Norwich and six from Yarmouth. This I believe was quite correct, as on the 27th of February I purchased a fine adult female, one of seven then hanging for sale in the Norwich Market. The remainder were sent to London, and had all been killed near Lynn.

Peregrine Falcon.—A fine adult female killed at Langley on the 9th.

French Partridge.—A covey of seven birds were observed by a fisherman on the 17th to drop exhausted into the sea off Cromer, and on rowing up to the spot they were all picked up alive—another instance, no doubt, of intended migration in this species (see 'Birds of Norfolk,' vol. i. p. 413).

* I must here correct an error in my previous notice, the word "eared" occurring instead of "Sclavonian" (Zool. S. S. 1127), under the head of "Divers and Grebes."—*H. S.*

Sea Eagle.—A fine young bird of this species was seen on several occasions during this month on the Upcher estate at Sherringham, near Cromer.

White-eyed Pochard.—A pair of these rare ducks, in the possession of Mr. H. M. Upcher, of Sherringham, were killed, during this month, at Dersingham, near Lynn.

APRIL.

Hawfinch.—About the 4th of this month a fine adult bird, with lead-coloured beak, was picked up dead in Catton Park, near Norwich.

Great Crested Grebes.—At a coot-shooting party, held on Hickling Broad on the 10th, no less than nine splendid specimens of this grebe, only just returned from the coast to their summer quarters, were ruthlessly slaughtered, and, of course, subsequently made into plumes.

Puffin.—An adult male, shot at Salthouse, was sent me on the 14th, and a young bird was killed near Holkham a few days before. A third specimen was also taken near Feltwell towards the end of the month, no doubt driven inland by some heavy gale.

Great Spotted Woodpecker.—On the 24th a fine adult pair were killed in a small plantation at Hickling, not far from the coast, and about the same time two others were shot in the neighbourhood of Stalham.

Woodcock's Nest.—On the 24th a woodcock's nest, with two eggs, was discovered in a plantation at Bixley, near Norwich, and subsequently a photograph was taken of the sitting bird by Mr. John Gurney, of Earlham.

Black Tern.—A pair shot at Hickling on the 27th.

MAY.

Spoonbill.—The occurrence of two immature males, at Yarmouth, on the 4th, has been recorded by Mr. T. E. Gunn (Zool. S. S. 1295). I have since seen the fine adult male, which he refers to as killed a few days later, in the collection of Mr. Overend, at Yarmouth.

Montagu's Harrier.—An adult male, killed at Yarmouth on the 13th, was almost dark enough on the back and wings to pass for a melanite variety.

Little Stint.—On the 20th I received a male little stint, in nearly full summer plumage, from Salthouse.

Common Dotterel.—Several "trips" seen this spring. On the 20th I had one from Salthouse, a young male; and an old female and young male were killed at Beeston, near Cromer, on the 18th.

Quail.—Towards the end of this month two or three pairs were seen on a farm near Diss.

Hoopoe.—A single bird seen at Northrepps, near Cromer, and frequenting the same place where a specimen was shot last year.

Bittern.—Mr. T. E. Gunn has recorded in the 'Zoologist' (S. S. 1220) the discovery of a bittern's nest, on Upton Broad, on the 30th of March last, which contained two eggs, now in his collection. In confirmation of this most interesting statement, I can now record the capture of a nestling bittern, at the same spot, which was brought up to Norwich alive on the 28th of May. This youngster was then in the down, and could scarcely stand, but it has since thriven well in confinement, having been purchased by Mr. F. Bell, of Bracondale, near Norwich. I have seen it on two or three occasions, and a full account of its capture and habits will be given in the second volume of the 'Birds of Norfolk.'

Orangelegged Hobby.—A very beautiful adult female of this rare species, in Mr. Overend's collection at Yarmouth, was shot on the beach on the 16th of May.

JUNE.

Turnstone.—One specimen killed out of a flock of six, on the 3rd of June, at Blakeney.

Great Spotted Woodpecker.—An adult male was shot at Swanton Abbott, on the 13th, and a female and two young ones on the 15th. A young bird was also caught by a cat at Catton, near Norwich, on the 13th, and an old female was killed there on the 17th.

Quails.—A nest of quail's eggs was taken on the 8th, at Harford Bridges, near Norwich: of these I saw seven, and twelve or thirteen were said to have been found.

Little Stint.—Received two very beautiful specimens from Salthouse, in full summer plumage, on the 18th of June, and two or three more had been seen.

Blackheaded Gulls.—In consequence of the severe drought this summer, the old blackheaded gulls, at Scoulton, have been hard put to it to find food for their young, of which many were found dead on the island; and, from the lowness of the water, lots of the young nestlings were suffocated in the mud.

Common Crossbill.—On the 28th a small flock were seen at Northrepps, near Cromer.

Pratincole.—A specimen of this very rare visitant, in Mr. Newcome's collection, was shot at Feltwells during the first week in June. The sex was unfortunately not noticed by the birdstuffer.

JULY.

Crossbill.—A considerable flock were observed, on the 11th, near the same spot, at Northrepps, where others had been seen in June, and in both instances the birds were pursuing a direct course inland. On the 6th two females and one male were killed, and others seen, at Kirby-cave, near Bungay.

AUGUST.

Rosecoloured Pastor.—The occurrence of an adult female near Yarmouth, on the 11th of this month, is recorded in the 'Zoologist' (S. S. 1377).

Common Dotterel.—About the 30th of August two males and one female were shot at Beeston, near Cromer.

SEPTEMBER.

Great Snipe.—One shot, on the 1st, at Limpenhoe; but although so abundant elsewhere, this autumn, I have heard of but two other specimens bagged in this county.

Sand Martin.—A pure white variety was shot at Horning, on the 17th, by Mr. H. Harmer.

Great Spotted Woodpecker.—A young bird killed at Ingham, on the 14th; and two more, on the 16th, one near Norwich, and the other at Beeston, near Cromer; also three more from different localities, between the 12th and 23rd, and one at Horsey on the 24th and another on the 26th.

Crossbill.—On the 14th an old male, in reddish yellow plumage, was killed at Shottesham, and another at Holkham on the 25th.

Pied Flycatcher.—A most singular immigration of this species has been observed this month, at Gunton, near Lowestoft, on the Suffolk coast, by Mr. G. G. Fowler. In sending me two immature specimens on the 16th, he writes that, on the previous day, he had seen some twenty or thirty within a hundred yards of the house (situated only a short distance from the sea), and, strange to say, all young birds. He shot six or seven all in the same plumage, young birds of the year,

and they appeared to go in small parties, probably nests. He first observed them on the 14th, when out shooting, frequenting the fences, and where one was heard or seen others were soon met with. On the 15th they seemed abundant everywhere, but on the 16th there were not so many, though still numerous. The two birds sent on the 16th were, as near as one could judge, by dissection, male and female, and two more killed on the 18th were both females. Up to that time not a single bird had been seen in the ordinary adult plumage; and two others, shot on the 19th and 21st, also proved to be an immature male and female, the former slightly darker in colour than any of the rest. A pair or two have been generally seen in that neighbourhood every year, and during the last two years more than usual; but this flight is something quite new, in our experience of this species, either on the Suffolk or Norfolk coast, their numbers at once attracting attention, in spite of their unobtrusive plumage, whilst the absence of adult specimens is very remarkable. Is it at all likely that in this species the dark plumage is laid aside at the close of the breeding season, and young and old assume the same sombre tints?

Crossbill.—On the 16th, as I am informed by Mr. Rising, of Horsey, near Yarmouth, several crossbills were observed on a crab-apple tree opposite his house, busily feeding on the fruit, and though some children were employed at the time gathering the apples, the birds were not to be frightened from their feast. The mischief done by them in so short a time was remarkable, there being scarcely a bough on the tree that did not exhibit some symptoms of their taste for the juice of the crab. Three specimens were shot, of which I saw two, an old male and female, and the breast of the latter seemed to indicate that she had been sitting. On the 15th another male was shot at Carlton, near Norwich, and an adult pair, on the 21st, at Beeston, near Cromer.

Osprey.—A fine bird of this species was taken near Strumpsham, on the 19th, having been caught in a trap placed on a gate-post and baited with some small bird.

Greenshank.—An immature bird was killed at Clay on the 18th. This is a species from some cause much more scarce now than in former years.

Glossy Ibis.—The bird recorded by Mr. Gunn, in the 'Zoologist' (S. S. 1423), was killed at Stalham on the 13th; and I have since heard from Mr. Rising, of Horsey, that an ibis was seen in the vicinity of Yarmouth early in January last. I know of no other specimen

killed on our eastern coast since 1850, when a fine adult female, in Mr. J. H. Gurney's possession, was shot on Blundeston Marsh, near Lowestoft.

Merlin.—A female shot near Swaffham on the 21st, a young male at Filby on the 27th, and another at Hanworth, near Cromer, on the 28th.

OCTOBER.

French Partridge.—Two curious varieties were shot at Honingham, about the first week of this month, having the feathers of the tail and wings white; both birds, singularly enough, were exactly alike.

Ring Ouzel.—An immature male, shot on the 1st, had a few white feathers on the chin and throat and one white feather under each eye, giving it a very curious appearance. An adult male was also shot on the 13th.

Redthroated Diver.—A very perfect specimen, with bright red patch on the throat and scarcely any white feathers appearing on the head or neck, was exposed for sale in our market on the 10th of October, and another, in similar plumage, on the 27th of September. A great many have been seen off the coast.

Bittern.—A male bird was killed out of a reed-bed at Gunton, near Cromer, on the 7th—a rather novel locality.

Rock Pipit.—Whilst shooting on Breydon, on the 13th, Mr. T. E. Gunn killed three out of four rock pipits, which he found feeding about the boundary wall. No others were seen at the time.

Crossbill.—Another red male was killed at Beeston on the 17th.

Sandwich Tern.—A fine adult male, just changing to winter plumage about the head, was shot on the 7th, and had a sand-lance in the stomach weighing seven ounces.

Great Spotted Woodpecker.—A male, killed on the 16th, had a slight trace of red on the crown as well as the red patch on the occiput usual in the adult plumage. Another was killed at Jacolnestone on the 20th, one at Lakenham on the 25th, and one at Hickling on the 28th. The majority of those obtained this autumn have been immature birds, and for the most part obtained in the vicinity of the coast.

Great Gray Shrike.—One specimen killed at Hickling on the 21st.

Peregrine.—Mr. J. H. Gurney, jun., informs me that, on the 19th, he received a young female peregrine from Lindford, near Thetford, which measured four inches and a half across the back.

Little Gull.—An immature specimen was shot on Breydon on the 4th of October, the only one I have heard of this season on the Norfolk coast, although so many have been killed in Yorkshire.

NOVEMBER.

Longtailed Duck.—On the 3rd of November an immature female was sent me from Salthouse, and two immature males were shot at Heacham on the 22nd by Mr. A. W. Partridge. From that gentleman I learn that a flock of about a dozen had been seen there for some days regularly frequenting the "Bay" at the turn of the tide, and keeping generally about two hundred yards from the shore. Five adult males rose when he killed the two young birds.

Great Spotted Woodpecker.—An adult male on the 5th and another on the 10th. An adult pair at Beeston on the 28th, and two more, immature, on the 19th and 24th.

Great Gray Shrike.—A male bird killed at Martham, near Yarmouth, on the 16th.

Storm Petrel.—Several storm-driven specimens were picked up this month. One caught alive by a boy, on Surlingham Broad, on the 5th, one at Burgh on the 12th, one at Wells on the 14th, and a third the same week at Beccles, Suffolk.

Hen Harrier.—Mr. J. H. Gurney informs me that a female of this species was sent him from Lindford, near Thetford, on the 14th.

Snow Bunting.—These winter visitants are so abundant on the coast this winter that, in spite of the mildness of the season hitherto, one looks for hard weather soon: the appearance of adult longtailed ducks so early is also another indication.

Purple Sandpiper.—An immature bird shot near Lynn.

Sclavonian Grebe.—Two fine old birds, in winter plumage, killed at Horsey, on the 27th.

Bittern.—November 29. A very fine male bird, in the Norwich fish-market, weighed three pounds and a half.

Pied Pheasant.—A very singular variety was killed, about the 29th, in this county, having the whole of the head, neck, upper half of the creast, back and tail-feathers of the usual colour, but the lower part of the breast, the wings, thighs and under parts generally pure white. The very even line of demarcation between the white and brown had a remarkable appearance.

DECEMBER.

Roughlegged Buzzard.—A fine immature bird was shot near Wolterton, on the 5th, and another about the same time, near Yarmouth.

Woodcocks and Snipe.—There has been a fair sprinkling of cocks throughout the county, though not to be reckoned a "big" season; and snipe have been very plentiful at times. On the 5th we had some twenty couple hanging for sale in our market.

Great Spotted Woodpecker.—A young bird, from Runham, on the 5th.

Crossbill.—A fine red male was shot at St. Faith's, on the 11th, and a few days previous several are said to have been seen feeding on some berries in the garden of the Lower Close, Norwich, within the city walls.

Bittern.—Another very fine bird, shot at Hickling, on the 11th.

Sclavonian Grebe.—Another old bird, in winter plumage, shot at Wretham.

Immigration of Wood Pigeons.—A gamekeeper, on whose statements I can thoroughly rely, and who has for some time been making careful observations on the birds that arrive and leave our coast, informs me that he has lately seen very large flocks of wood pigeons flying inland in a direction from the sea, and believes they make the land between Cromer and Overstrand. In the first week of December he must have seen thousands, for the most part high overhead, and invariably taking the same course.

HENRY STEVENSON.

Notes at Rainham, Kent, and Neighbourhood.

By F. D. POWER, Esq.

SEPTEMBER AND OCTOBER, 1868.

Peregrine.—One was seen by my brother on a marsh near the mouth of the Medway, on the 1st of October: it dashed down to a dunlin that he had just wounded, but did not take it, and made off on receiving a long shot. In the winter of 1866-7 two peregrines were obtained on this same marsh, and others have been seen occasionally, always in the winter months.

Merlin.—First observed on the 12th of October; but it is a rare species here, although a pair used to frequent a particular wood every

winter for some years: they first failed in 1867, and had not appeared this year at the end of October.

Flycatcher.—Remained about the orchards in considerable numbers until the 26th of September, when all disappeared.

Fieldfare.—None observed until the 20th of October, and not many arrived by the end of the month. Not a numerous species here at any time.

Redwing.—First seen on the 9th of October: on the morning of the 21st a considerable migration of these birds took place in a south-westerly direction.

Blackcap.—One remained about the garden till the 16th of September, singing occasionally, but feebly, up to the last.

Yellow Wagtail.—Numerous up to the middle of September on the marshes; they then rapidly became scarce: last seen on the 6th of October.

Gray Wagtail.—Observed on the marshes first on the 8th of September.

Rock Pipit.—September 24. One seen. Numerous on the Saltings by the 2nd of October. A common species here in winter.

Chaffinch.—A great migration of these birds commenced about the 8th of October, and continued every day throughout the month. This movement was always in a W.N.W. direction, and most marked in the early morning, generally stopping about ten o'clock. Flock after flock passed over in rapid succession and at an average height of forty yards, but on clear mornings they would be very high; in fact, only just visible, and only to be discovered by following the direction of their incessant "chinkings." I noticed a similar migration last year about the same time, but not to such an extent.

Brambling.—First noticed on the 2nd of October. These passed over much in the same way as the chaffinches, and were often mixed up with them: few in comparison with the chaffinches, but still more numerous than I have seen them before.

Tree Sparrow.—Appeared on the 26th of September. Large flocks were passing over in a north-west direction during the first part of October. Numbers always remain in the district during the winter.

Hawfinch.—October 9. Saw one. Not an uncommon species in the summer, but always rare in the winter months.

Twite.—A flock on the marshes on the 1st of October: numerous by the end of the first week.

Raven.—Seen several times about the creeks and marshes during the first part of September: on one occasion saw four together. This is the only time of year that we see these birds in this district.

Hooded Crow.—One seen on the 1st of October; numerous by the end of the second week.

Kingfisher.—Not uncommon about the marsh ditches in September; much fewer in October: this is, as a rule, the only time that they are to be seen here.

Swallow.—An immense southward migration took place early in October, most marked on the 6th, 7th, 8th and 9th. Hundreds were passing for two or three hours each morning in an almost continuous stream, and flew very low, only just skimming over the Saltings.

Golden Plover.—Met with a small flock in a neighbouring marsh on the 7th of October: this is an early appearance for them in this district.

Gray Plover.—First observed on the 18th of September, three together. They are never very numerous here.

Whimbrel.—Scarce this year, even in September, but they appear to have returned and moved on further south earlier than usual. I was told that they were extremely numerous early in August. Last noticed on the 7th of October, when I saw three.

Green Sandpiper.—Also very scarce this year—a striking contrast to their great abundance here in 1867. This scarcity is to be attributed to the drying up of the ditches during the summer. I saw only two specimens throughout September. The common sandpiper was also scarce.

Greenshank.—Appears to have been more abundant than usual on the marshes at the mouth of the Medway. I heard of several being killed during September, and we received one in the flesh which had been shot on the 16th.

Snipe.—Scarcely to be found at all, on account of the dry state of the marsh ditches. September and October are generally the best months for them here, but I scarcely saw half a dozen during the whole time, and I did not meet with a single jack snipe.

Knot.—Quite a rare bird in this district. My brother shot one on the 18th of September, and we saw another at the same time, but this is the only occasion on which we have met with this species here.

Landrail.—One flushed in the woods by a shooting party on the 1st of October.

Common Tern.—Very abundant this year, and continued numerous until the end of September. Small parties of about a dozen seen early in October, and for the last time on the 10th. Immature birds predominated largely—I should think quite fifty to one.

Lesser Tern.—We had an immature specimen brought to us alive on the 11th of September: it was discovered inside the sea-wall, and was caught without difficulty. Very uncommon here.

Black Tern.—Never numerous. A few appeared about the creeks during September: shot one, a bird of the year.

Blackheaded Gull.—September 29. My brother killed two splendid adult birds, both having, in addition to the roseate breast, a most beautiful rosy pink hue on the four outer quills of each wing; most marked on the shafts. Specimens with roseate breasts we have not unfrequently met with here in winter, but until now had not come across any with such a colour on the wings: the general effect was extremely beautiful.

Skua.—Two were shot in this district during September, one in the immediate neighbourhood at the beginning of the month, and the other in Stangate Creek on the 28th. This last was a very nice specimen of the pomarine skua, and, according to Yarrell, in the plumage of the second year: it was chasing terns when first seen, and proved tame, allowing a near approach in a boat as it sat on the water. The other bird appears to have been also of this species.

F. D. POWER.

Ladywell, Lewisham, November, 1868.

Ornithological Notes from the County Dublin for 1867: *Extracts from the Log of the "Gray Gull."* By HARRY BLAKE-KNOX, Esq., J.P.

(Continued from Zool. S. S. 1410).

REDTHROATED DIVER.—*Red-throated in January.*—January 21. A redthroated diver watched to-day, by aid of a glass, was in full redthroat and lead-coloured neck. Never having examined one of these early-assumed summer-plumaged birds (?) I cannot state if they are first-year adults or very old birds that, after a certain age, unhealthily

or perhaps naturally, retain the plumage of the past summer; or, more likely, that they are adult birds that change the winter plumage to that of summer, by the mere addition of new-coloured pigment, and not by moult, as is the case among many other sea-fowl. It may be, though I have no cause for such a supposition, that the supposed distinctive marks of summer plumage, in cases of extreme age, become confirmed. (See Zool. S. S. 681.)

In perfect Summer Plumage in October.—October 15. Two adult redthroated divers passed me on the wing to-day, and, thanks to Eley and his wire-cartridges, one of them fell dead. It was a splendid specimen, and, late as it is, in rich full summer plumage, without any indication of moult, though somewhat faded by age.

On the Autumn Moult of Adults.—October 28. Shot two adult redthroated divers to-day off Salthill: they were in very strong moult. No. 1 has very few of the red- and lead-coloured feathers of the neck remaining; the new feathers in these parts are white, some in the red patch being lightly edged with gray. The bill is changing from the black of summer to the blue of winter, having at this time a tortoise-shelled appearance from the two colours. The eye still as bright as in summer, brighter than arterial blood-red, but not crimson, like the stuffers' eyes. Several of the beautiful mane-like feathers are in the neck still, though the winter feathers in that part are most abundant. The back, scapulars and wing-coverts are half in summer and half in winter. Every old quill-feather is from the wing, and their place supplied by the stumps of the new quills, all exactly the same length, showing how uniform and rapid is the moult in this part. Strange to say, in the breast are several feathers quite black, reminding one of the abnormity in colouring so often noticed on the white under side of several flat-fish, particularly the flounder. No. 2 has considerably more red feathers in the throat and lead-colour in the neck: in other respects it is quite similar to No. 1. Both the primary and secondary quills are all new, all equal in length, about one-third grown, showing that all are lost and all assumed at the same time—in these two birds I might say the same day. The new quill, in the divers, grows from the pen of the old quill; thus in pulling out an old quill in moult time you will pull out the young embryo more or less developed, either as a globule of blood and pigment or a tube of the same matter, so when the young quills have taken root and are ready to come forth they push the old ones out before them. It must be essential to the divers to have the wings of equal strength, pecu-

liarly as they are shaped, when using them as oars under water—an obvious reason for the uniformity of the moult: so beautifully mindful is Nature of her smallest creatures! When devoid of quills they are easily approached and killed.

Independent Flight.—October 22. Cruised upon the White and and Oyster Banks to-day in pursuit of Colymbi. Noticed them in small numbers. They were also very wild, taking wing on being approached. Failed in getting many shots at this class of bird, but dropped pretty lively on gannets, ducks and a goosander. When heading for home two bore down on me in full flight about thirty yards high: as they passed over I gave the leader (they always fly in file) the first barrel, which brought him up all of a lump, but, recovering, he was flying away, when I put the second charge into him: this injured his wing, and he fell about two hundred yards from me, disappearing under water, and was not seen by me again. His companion flew on in the same direction, but soon returned, as if in search of his lost companion, flying most gracefully over and round the boat, uttering the one syllable "quack" monotonously. I dropped him with a cartridge, and though he fell vomiting blood I could not get a second shot at him, so expert was he in the water, showing but the head above the surface, which, coupled with an ugly cross sea, caused me soon to lose him. I mention this incident to prove that the wing is not only used to help the divers from one place to another, but that they can evolute in the air as well as the best of the Anseridæ, to which in flight they are very similar. It also would prove that they are not the selfish, unsociable birds, devoid of affection, that they are generally considered; for these birds had not even the advantage of being mated adults, but were young of the year. I have frequently noted with what affection a diver will linger about the spot where its companion was killed, uttering its soft, wild, wailing note; and cruelly have I decoyed them to the same fate by an imitation of their plaintive cries. Another, flying in to fish on the shoals of Merrion, seemed quite as uncertain where to alight as the wariest old mallard, but kept flying in converging circles like this bird till he had decided on a place, then, gradually lessening the circles, alighted with ease on the water. When approaching him in the shoal water with the punt, I gave him a wide berth to leeward. When about three hundred yards to windward of him, and as I gradually began to close him, his suspicions were aroused, and he rose like a duck from the water, crossing my bows within ten yards. (Before I have stated how foolish

these birds are in approaching a boat when on the wing). Strange to say, I shot him by accident with one of Eley's breech-loading wire "long-distance" cartridges. To show the uncertainty of these affairs, I found the wire cage felted, literally blended with the feathers, under one wing, and quite empty, showing that it had discharged all its shot within *ten* yards, instead of keeping up the propulsion till about sixty yards from the gun. Yesterday I shot a gannet with one between ninety and one hundred yards off: it passed through him like a bullet. It is a great pity some improvement cannot be made. To the potting game-shooter they are good enough, but an improvement on them would rid Ireland of many an old cock grouse: half a dozen of these old birds brought to bag in a day is good sport for a man of tough sinews on an Irish mountain, after "Manchester" has bagged the young birds and hens, leaving these old Mormons to break the eggs in the coming season, one of them doing more harm than a dozen hawks. How invaluable something sure to kill at eighty yards would also be to the naturalist!

Deglutition.—October 29. Spent a profitable hour before breakfast this morning watching a redthroated diver feeding. Being about thirty yards from my place of concealment I could note, with the powerful glass, each secret glance, each wind-ruffled feather of the fair beauty, and never did I use the same old glass with more eagerness to find out wrinkles amongst the "ballets" or the "boxes" than I did at the present time. With incessant fishing and labour it caught three small flat-fish in the hour. It did not shift its *locale* more than a few yards, for it evidently knew its breakfast was there. With each fish it rose to the surface, and did not attempt to swallow it till it was killed: this was done by repeated snaps, shakings, letting goes and catchings again. When a fish was let go and showed any activity in the water, the eagerness of the diver to secure it again was ludicrous in the extreme, the eye showing every expression of fear, hope, determination, success and satisfaction, as plain as eye could speak. When killed these small plaice were too flat and stiff to pass easily and completely down the throat, so were passed backwards and forwards through the bill (as I know cormorants to do, in confinement, for the same purpose), to soften the points of the side-fins and vertebræ. Each victim took from five to ten minutes to manipulate, and was then swallowed with rapid gulps. The fish being quite flexible from all this champing, was easily doubled up, side-fin to side-fin, and went down head foremost without much effort. No doubt "round"

fish would cause less trouble, but still I don't think any living fish are swallowed, the fins being too dangerous to the throat.

GREAT NORTHERN DIVER.—*Numerous off the Dublin Coast in the Winter of* 1866-67.—January 30. The northern diver has been very abundant off this coast this winter. Of forty-three examined twenty-nine were young in first winter plumage; the rest in second, third or adult winter plumage: none of these birds had the black throat, though some had a few speckled feathers in the back. February 8. Watched many northern divers through a powerful glass: out of twenty thus examined four were assuming the dark neck of summer. A well-advanced bird in the moult attracted my attention, and laying aside the glass I took to the sculls, and Harry Kelly never contested harder for the Thames than did I for this diver. She now, poor thing, displays her moult in my collection, and being a very old bird is rather interesting in showing that the northern diver has a distinct winter and summer dress. Her back is more than half in the breeding dress, the neck a little more so, one of the rings being perfect. The eyes between crimson and liver-colour. The bill half black and half livid. February 20. They are growing scarce in the Bay, exceedingly wary, diving on the first approach of danger, and unaccountably disappearing. They are also very active on the wing, and provokingly fly on the approach of the boat. Two shot as they passed me closely on the wing. Saw no adults in the breeding-dress. March 1. Cruised all day in favourite localities, and saw but one diver, a young bird. March 24. Four met with to-day. Quite unapproachable. They are hauling off the coast. April 20. Five or six seen, chiefly on the wing. The northern diver remains off this coast (Dublin) till late in May, and frequents the Irish Sea all through the summer. I do not therefore think with Mr. Clark-Kennedy that it should be unusual to notice it off Birkenhead the second week in April (Zool. S. S. 1221). I see no reason why young birds of this and other species of sea-fowl should go northwards in the spring, as they do not breed till at least three years old. This also accounts for the slight difference in numbers between young and old birds, and, as young birds are less wary, are more frequently shot.

In Breeding Plumage in October.—October 24. Shot a splendid adult in full plumage. The feathers are so good in this bird that it seems a pity they should be discarded for the more sombre dress of winter: still the moult is indicated by a few white feathers appearing in the throat. It is undoubtedly a magnificent bird in this dress.

BLACKTHROATED DIVER.—*A Tale from a Shooting Punt.*—February 10. Took a Sunday walk to Howth, and with a glass had fine chances of acquainting myself with the habits of the Colymbi. I watched the actions of an adult blackthroated diver for some hours, not only with the glass, but the naked eye, for he fished within ten yards of the iron-bound coast where I sat. With the glass I could count every white-banded feather that was coming in the back. There was nothing peculiar in its actions or habits from those of its congeners. I left it with regret to pass a wild wet night in safety. February 11. The coldest morning ever I remember. By dawn I was at the divers' chief haunt.* By the gray light I hung round my little punt a drapery of sea-tangle, cast anchor (stone), and like a rock awaited the events of the coming day. The day opened cold and dull, with a stiff north-west breeze blowing from a bank of showers, which occasionally fell in all the piercing form of sleet, which, joining with the incessant spray from the short chopping waves, made my position anything but a pleasant one. Drearily the morning hours advanced, the sun making no appearance as he rose, but the eastern sky shone with a wicked lurid red (the rage spot on the cheek of Nature), made more ominous by the leaden gray of all around. I can never think now what infatuation caused me to remain where I was, for I am weather-wise, and can read the sky and the air better than the barometer. It came at last: the cold air changes to a moist tropical heat, the sea looks quite calm and tranquil—oh! we shall have a *grand* day. But why do my hands tremble as I encase the gun in his waterproof mantle?—why does the "carry" scud so swiftly overhead?—why do I let out eight or ten more fathoms of rope to my moorings?—where is that great forest through which the wind seems to be rushing when all around is so calm?—why do I curse my stupidity in not having a good-sized baler on board?—why are my eyes intently bent on the north-west? Look, kind shore-going naturalist, and you will see a whity-gray cloud obscuring those dear old hills I love so well: that cloud may dim my sight as it does them. See! it has touched the sea now, and see how the water boils and foams beneath its weight—so heavy is it the sea cannot rise in waves, but is driven before it like

* I had found out that there were several blackthroated divers off the coast, and for the purpose of procuring some I had arranged to fire at nothing else. This cold-blooded determination is the only way to insure success. The man that keeps blazing away *may* drop on something rare, but not often. Scores of good fellows give up the pursuit, because they can never *kill anything but common birds.*

smoke: I feel that I am suspended in the air—the squall as much beneath as above my boat: there is no noise, and the "gray mare" is dashing away eastward like a phantom: I feel I have gone through something—I know not what. But now the sea is shrieking on every side—so heavy the blast that the waves cannot rise, but pass away in foam. Of course it was too late now to reach land: four oars could not have urged my boat to shore, and if my mooring-stone did not hold—I was riding at the full length of my rope—well, if it did not hold?—would that I were among the land-birds, that is all. I had no alternative but to look about me, and curse my folly for venturing so far to sea, such a threatening day, on a wild-goose chase. The short waves dashed into my little bark, drenching me with spray, the leaden clouds scudded across the sky, the sleet fell in torrents, and the blast like ice whistled through the sea-weed that dangled about my boat. Baling now became imperative. Faith! I would have bailed my worst enemy that minute to have been ashore at my comfortable breakfast, for the only baler I had was a sardine-box, and only one half of the lid cut open, so that I found it as hard to get the water out as I found it easy to get it in! Indeed I was in a fix! However, as the wind held steady, the white squall settled down into a decent rolling sea, which my little boat, with some aid from the paddles, breasted like a duck, and if it was not for the dread apprehension that my mooring-rope might cut on the rocky bottom I might have enjoyed the wild grandeur of the scene pretty well. There stretched charming Dalkey and Killiney with their villaed hill-sides,—there lay Dublin Bay, second in beauty not even to that of Naples,—there the Wicklow mountains capped with storm,—all in-shore of me, seen through the smoke-like spray. Howth, to the right, rising stern from the seething waters;—Bray Head, to the left, lost amid the foam caused by the eddying blasts from its own round summit;—all that way full of hope. To the east, the cold green sea, enlivened by the occasional struggling flight of a weary gull making to the harbouring sands—what would I not give to tramp them now!—all out there utter despair. * * * * With twelve o'clock the day cleared, the sun broke out, fitfully, it is true, but I blessed its feeble rays, and prepared for breakfast—a wet crust and a pocket-flask. Though the wind still blew in showers, and fresh enough, the fear of a watery grave had left my mind,—a cold death the best of us shrink from,—so I spent my time not unprofitably in watching the habits of the northern and redthroated divers from their own level. I noted many of the ways they avoid breaking waves,

how buoyantly they swim in this kind of weather, and many another little trait interesting to none but him who looks on and calls himself a naturalist. * * * * Perhaps it was all the watching—perhaps seeing such banqueting going on around—made me feel inclined for a mid-day meal, a thing I had not calculated on, expecting but a morning watch. Emptying my flask, and with a piece of "twist" in my mouth (I abhor the habit), I lay ruminating the tobacco and my thoughts together, the former hinting of sleep, the latter all verged on the depression of a wild-fowl shooter's life. A cormorant awoke me drying his wings as he stood on the stern of the boat: my opening eyes alarmed him, and we gave each other gaze for gaze. Whether he took my boat for a piece of floating timber, a rock or a buoy, I cannot say; but surely no eye ever bore the look of bewildered terror his did as he scuttled off dashing up the water with his wings.* Obstinacy is not the frailest fibre of my nature, nor determination the least brittle; but that day—oh, Boreas, cold-breathed deity! how you tried me! Nature, too, sweet dame! how hard thou strovest to save thy "precious chicks" by sending to my arms and to prowl around my floating concealment great northern and redthroated divers in all the uncertainty of plumage! Such dire temptation! yet still no shot disturbed the unceasing sound of the disquiet sea. No, not even when that speckled monster in his spring moult shook the brine from his wings into my face. No stampeding after so long a wait. * * * Twilight is again *rising* in the east, and is slowly casting its shadows on the still struggling sea. Ten hours are a long cold watch; but still the uncertain wheel with its blind-folded girl are drawing to his doom one of the most beautiful of created things. Silently he rises from the depths of the dull dark waters, a being so wonderful, so beautiful, so animated, that I cannot raise my gun—it would be murder. Silently he glides unharmed into the mysterious depths, by a dive so *liquid*

* A cormorant once perched himself on my back, as I lay concealed on a rock enveloped in a drab driving-coat, which so closely resembled the rock in colour that even *he* was deceived, and, taking my back as the highest pinnacle, accommodated himself accordingly: neither did he discover his error till my hand grasped him by the legs. I have frequently had cormorants and shags perched around me within a few feet; but their suspicions seemed generally to be aroused by *human smell*, unless I had rubbed iodine on some part of my clothes. It is a most ludicrous thing to see them walking around one within a few feet, shooting out their long necks and staring with their fierce green eyes. Whether it is from the natural loneliness of sea-birds' haunts, they do not seem to apprehend danger like land-birds, but when they do see it they are generally far more wary.

that he seems an embodied particle of the element in which he lives: only though to rise again so near my concealment that his hoary neck and blood-red eye, his speckled throat and riband back, glisten in all their beauty before my eyes. Thanks, Fortune, for that rich five minutes of association in all the tranquillity, in all the happiness, in all the confidence of liberty, with so rare, so beautiful a creature. Dive far from me, poor blackthroat, hasten away with some lurking fear, change that calm look of trust to the furtive gaze of suspicion—do not die with that gentle look upon *my* face. There! see me now! long as I have waited I will not take your life. Ah! thou didst well to make that hurried plunging dive, for the naturalist has fallen to the mere collector of specimens, and the hound seeks recompense for his wait by blood. Bah! hast thou risen again but seventy yards away? has idle curiosity tempted thee to look upon the stealthy wild-fowler? thy chance is gone—thy doom is sealed. The rusty barrels quickly creep along the prow, the snake's head grins upon the dexter cock thrown back to strike: it strikes—and with his death the twilight shadows into night. Such is life to the Irish wild-fowl shooter, by night and by day, its fortunes ever varying—unlimited success, nights of weary watching: the sportsman often, the naturalist always: the wild bird the key to our hearts.

Probability that there are two kinds of Blackthroated Divers.—The bird just mentioned quite agrees with the account of authors as to plumage and formation—that it is more similar in figure, bill and plumage to the great northern than to the redthroated diver: it is certainly a more robust bird, though not longer than the redthroat; it has also a much deeper and decurved bill, and generally weighs considerably more. Now we have a blackthroated diver that frequents the east coast of Ireland during winter that is so similar in build, weight and formation of bill, as well as being speckled in immaturity like the redthroat, that it requires an experienced eye to discriminate between them and redthroated divers, except when black is to be seen on the throat. Either these birds are the young of the well-known blackthroated species (C. arcticus) or they are a distinct species. Authors tell us that the young of C. arcticus is very similar to the young of C. glacialis; that is, the feathers of the upper parts are grayish or bronzy black edged with hoary gray: the lesser imber of the ancients is supposed to refer to the young of C. arcticus, as the greater imber does to C. glacialis. I cannot argue this, nor can I say whether the well-known C. arcticus is similar to C. glacialis in its

immaturity; our best ornithologists have not corrected it, if wrong, to the present day. *Query.*—May not those specimens of C. arcticus, which are similar in plumage to the adult northern diver in winter plumage, be adult blackthroated divers (lesser imbers) in winter plumage, and not, as supposed, young birds? As I said, our common blackthroated diver is so similar in its immaturity to the redthroated diver that it requires an experienced eye (and even then with hesitation) to discriminate between them, for both birds have the two divergent white spots at the tip of each feather of the dorsal surface: in bill they scarcely differ, the length and proportion being about similar. Generally the redthroated diver has the under surface of the lower mandible levelled, as it were, off and upwards, giving the bill the appearance of being recurved, though the upper mandible is straight or almost so: invariably the blackthroated diver, *similima septentrionalis*, has the under mandible straight, and has no recurved appearance, very similar in cases to that of the great crested grebe. Unfortunately this cannot distinguish it from the redthroated diver in all cases. I have one of these blackthroated divers in my collection that has the speckled back, and the black throat imperfectly assumed. Had the bird lived I should imagine it would have been similar in a few weeks to the redthroat in breeding plumage, but that the triangular patch on the throat would be black instead of chestnut. Some writers have believed that C. arcticus was the male of C. septentrionalis. Now why so? Surely no one could confuse the very distinct nuptial garb of C. arcticus with the totally different nuptial garb of C. septentrionalis. May they not have found the diver I allude to similar to the redthroat, but having a black instead of a chestnut patch on the throat? If I cannot claim a species I can, I think, claim precedence in publishing that the blackthroated diver proper (if it be so) is similar in its immature plumages to the redthroated diver, in so far as the back is speckled similarly to that bird, and not after the type of the great northern diver. Blackthroated divers may therefore occur in many cases, and be mistaken for redthroats. But should it be clearly known (I am deficient except in borrowed knowledge) that the immature plumage of the blackthroated diver is similar to the immature plumage of the great northern diver, I think I have strong grounds for introducing the bird as an *obscure* species. Any adult blackthroated divers that I have seen have had the bill much larger, stronger and more northern-diver shaped than the largest redthroated

divers that I have seen—in fact, totally different in proportion and strength.

CORMORANT.—*The Cormorants of Dublin Bay.*—February 20. I never remember to have seen more cormorants in the Bay than this spring: great numbers appear to be adults, and are fully plumed with white, both on thigh and neck. They are excessively difficult to procure in this plumage about here, and, wild-fowler as I am, I was well pleased to shoot one of these patriarchs to-day. The plumage at this season undergoes a great change from that of winter, in addition to the white gorget and thigh-patch, the black mane and the white plumes on the neck, it thickens, glossens and becomes very rich in metallic lustre. Certainly they are beautiful birds, and shame be to him who maligns them. The channel of our River Liffey is marked by quaint structures of wood and stone, surmounted by a ball. Calmly on these balls our friends the cormorants sit, benignly gazing on the traffic beneath, while they stretch their sombre wings to dry, or pick and clean their plumage. They are desperate rogues, though, and "know if a gun is in a boat as well as a Christian." Whether Christians have a natural dread of fire-arms or not I cannot say, but cormorants that have no fear of peaceful traffic, at once, "skedaddle" on the approach of an armed boat. Again, lower down old Anna Liffey, we have the Bull Wall, a pier of rough blocks of limestone—a noble break to keep the sand from our river, a large portion of which (the wall) is tidal, and its position marked for high water by posts. These sign-posts are mere fir-poles, with four sticks forming a skeleton square or rhomboid, nailed across the top,—in a few instances the carpenter has been more liberal with his sticks,—the whole bedded in the blocks of limestone. Certain storms have loosened some of these posts, permitting them to swing as the tide washes them; others have got a "cant," as the saying is, and seem as if put up to mark the road to ruin, or to Bunyan's Pilgrim's Progress, or some such odd place—so bleached and time-worn do they appear: in fact, on their old scaly faces, chalked with cormorant lime, I have in fancy read the very words to "ruin and to waste," "Charles Dickens," &c., and by night have traced the dark pictures of Hablot K. Browne. Grimly as they look by day, more grimly far by night, as the sand bull roars, and the wind shrieks through their gibbet-like tops. Ah, me! many the pleasant day and night spent amongst them. But I am forgetting the cormorants all this time. Well, here they rest and here they roost, on these old poles, by day and night,

clasping the skeleton bars with their soft broad flexible feet: here they seem so much at home, so contented, so happy,—and is it not a meet place for them,—wild, drear, solitary. Every post is almost always certain to be occupied, except those that shake—you won't catch Carbo on one of them, it would hurt his dignity or his digestion, or both, to jolt from side to side. They have put these poles all a taunto now, and the carpenter has repaired his skeleton squares this spring, and cormorants are scarcer, and I miss old poles—the very best and hoariest of the lot. I rather dislike the place now: it is like a large hotel company and a good old hostelry—*better, but not so good.* I have left out another important stand: it is amongst these poles a perfect stone turret—I am sure I don't know why built, except to please the river gulls: this will often have ten or twelve cormorants on it, but never when a post is to be had,—for they are inveterate perchers,—and every shag that has not already got possession of a buoy. The shag never perches on ring of buoy, or sign, or pole, but must have a flat surface for his precisely similar feet to his perching brother. These sign-posts and the river in general is the chief haunt and stronghold of the cormorants of Dublin Bay. The colony is a numerous one.

HARRY BLAKE-KNOX.

Dalkey, November 5, 1868.

Erratum.—Zool. S. S. 1402, line 19, *for* "I discharged" *read* "I relinquished my gun."—*H. B.-K.*

List of the Rarer Birds obtained by Mr. Hart in the Vicinity of Christchurch, Hants.—1857. Roughlegged Buzzard. Shot at Wareham.

1858. Moor Buzzard. Christchurch.

1859. April. Kildeer Plover. Christchurch. The only one ever known to have been seen in England. (Ibis, iv. p. 277.)

Kentish Plover. Christchurch. Not included in Mr. Wise's list of the New Forest district. In 1862 my father shot one in Christchurch Harbour.

1861. Little Auk. Christchurch.

1862. January. Black Guillemot. Christchurch. Not in Mr. Wise's list.

„ Gray Shrike. Wareham.

April 26. Little Bittern. Christchurch.

June. Honey Buzzard. New Forest.

August. Merlin. Wareham.

October. Blacktoed Gull, Merlin and Snow Bunting. Christchurch.

November. Osprey. Christchurch.

1863. June. Honey Buzzard. New Forest.

October. Montagu's Harrier. Salisbury.

October. Snow Bunting and Merlin. Christchurch.

November. Fulmar Petrel. Christchurch; picked up after a gale. Not in Mr. Wise's list.

1864. January. Wood Sandpiper. Christchurch.

March. Black Redstart. Christchurch.

April. Merlin and Hoopoe. Christchurch.

October. Eider Duck. Christchurch.

„ Spoonbill. Christchurch. Not in Mr. Wise's list.

November. Forktailed Petrel. Christchurch.

1865. January. Ferruginous Duck. Christchurch.

May 4. Avocet. Christchurch.

„ 5. Squacco Heron. Wareham. I had the sternum.

September 30. Osprey. Christchurch.

1866. May 2, 3 and 18. Black Tern. Christchurch.

September 17. Storm Petrel. Wareham.

October 22. Glossy Ibis. Wareham.

„ Little Crake. Christchurch. Not in Mr. Wise's list.

1867. March 20. Avocet. Christchurch.

June 15. Two Little Bitterns. Essex.

August 9. Black Redstart. Wimborne.

„ 22. Wood Sandpiper. Christchurch. Not in Mr. Wise's list.

„ Black Redstart. Christchurch.

September 1. Montagu's Harrier. Wareham.

October 30. Montagu's Harrier. Swanage.

„ Two Forktailed Petrels. Christchurch.

December 8. Sabine's Snipe. Wareham. I had the sternum.

1868. April 27. Cravat Goose. Christchurch. I inspected it in the flesh.

May 23. Eider Duck. Poole.

„ 8. Sabine's Snipe. Wareham (Zool. S. S. 1293). Sabine's snipe is now generally regarded as only a melanism of the common species, but a parasite from this specimen was sent Mr. J. Cordeaux, who ascertained that it was not the same as the parasite of the common snipe.

June 6. Roller. Dorset. Not included in Mr. Wise's list, but Mr. Hart wrote to me while it was in the flesh.

June 14. Black Redstart. Christchurch. An unusual date.

„ 26. Great Shearwater. Swanage.

July 22. Night Heron. Ringwood. I had the sternum.

August 6. Wood Sandpiper. Christchurch.

„ 28. Wood Sandpiper. Dorset.

„ 31. Solitary Snipe. Christchurch (Zool. S. S. 1422).

September 19. Solitary Snipe. Christchurch.

„ 24. Richardson's Skua. Wareham.

„ 30. Storm Petrel. Swanage.

October 9. Merlin. Christchurch.

November 6. Nutcracker. Christchurch (Zool. S. S. 1481).

„ 26. Montagu's Harrier. Cranborne.

These without dates:—Sea eagles, golden eagle (?), goshawk, kite, golden oriole,

rose pastor (shot by Mr. Hart), White's thrush (the one in Lord Malmesbury's collection figured by Yarrell), bearded tit, Caspian tern, little bustard, black stork (Poole, Earl Malmesbury's collection), little egret (Mr. Wise alludes to one shot some years ago at Hale, and I expect that was the specimen Mr. Hart had), creamcoloured courser (not in Mr. Wise's list), hooded merganser (of this bird I entertain doubts: it was sold to a person named Locke: Mr. E. Hart remembers that it was a male in very striking plumage, but the birds of Mr. Selby and Mr. Eyton are in the "dun diver" dress), little gull, Bewick's swan, orangelegged hobby (not in Mr. Wise's list). Mr. E. Hart or his father (the late Mr. W. Hart) had all the above-named birds in the flesh.—*J. H. Gurney, jun.; Bank, Darlington.*

Bird Murder.—The following paragraph is copied from the 'Guardian' of November 18, 1868. Comment is unnecessary. "On a strip of coast eighteen miles long near Flamborough Head, 107,250 sea-birds were destroyed by *pleasure parties* in four months; 12,000 by men who shoot them for their feathers to adorn women's hats, and 79,500 young birds *died of starvation* in emptied nests. Commander Knocker, there stationed, who reports these facts, saw two boats loaded above the gunwales with dead birds, and one party of eight guns killed 1100 birds in a week."—*John Cordeaux; Great Cotes, Ulceby, November* 23, 1868.

Naturalists' Book Agency.—Allow me to draw the attention of the readers of the 'Zoologist' to the first, second and third pages of the advertizing sheet of the October number of the 'American Naturalist.' There they will see an admirable plan, now in full operation in America, for the purpose of enabling naturalists to procure pamphlets and papers on Natural History subjects, which might not perhaps be easily procured through a bookseller. Some such plan, I am convinced, if carefully carried out in this country, also would not fail to be of infinite value to British naturalists. The advertisement referred to above will fully explain itself, and it only requires that the attention of the readers of the 'Zoologist' and of naturalists in general be directed to it, to have something of a similar nature started in this country. The plan is quite simple, and, as I have said already, would I am sure be of great use to a large body of British naturalists.—*John A. Harvie Brown; Dunipace House, Falkirk.*

Whitetailed Eagle in Sussex.—About seven o'clock in the evening of the 8th of November a fine specimen of the whitetailed eagle, a bird of this year, was shot with a charge of No. 5 shot by John Bearman, head keeper to Viscount Gage, in Compton Wood, Firle Park, near Lewes. This bird had been seen about during the preceding fortnight, and attempts had been made to take it in traps baited with rabbits, partridges, &c., but without avail: at length, on the evening of the 8th, it was seen on a tree, and brought down, as stated above. At the present time it is in the hands of Swaysland, the naturalist, for mounting, and has attracted considerable attention. Some years since one of these birds was shot in Shoreham Harbour while gorging itself with dead fish, and in 1858 a very fine specimen was shot in Arundel Park, in this county.—*T. W. Wonfor, Hon. Secretary Brighton and Sussex Natural History Society; Brighton.*

Capture of an Osprey in the North Sea.—A fine osprey was captured during the latter part of September, by the crew of the Norwegian barque "Lina," when in the middle of the North Sea: being exhausted it had settled on the rigging of the vessel, and was easily taken. It is now alive, in the possession of Mr. Townsend, of Ipswich, and is said to be remarkably tame.—*T. E. Gunn;* 21, *Regent Street, Norwich.*

Peregrine Falcon and Merlin in Norfolk.—An immature female of the peregrine was shot, on the 30th of October, at Gunton, near Norwich. On the 26th of September a mature female merlin, from Briston; on the 28th an immature male, at Hanworth; and, from Briston, an immature male on the 10th of November, and a female (also immature) on the 13th. The stomach of the first-named merlin contained the remains of two nestling thrushes, with the wings swallowed entire, which show the stumps of the partly-developed feathers.—*T. E. Gunn.*

Merlin at Faversham.—A male specimen of the merlin, in fine plumage, was shot at Faversham, on the 3rd of this month.—*John Hunter; Faversham, November* 18, 1868.

Roughlegged Buzzard in Suffolk.—On the 7th of October a beautiful specimen of the roughlegged buzzard was shot at Knoddishall, near Saxmundham. The bird was killed while hovering over a pond on which were some ducks.—*T. E. Gunn.*

Great Gray Shrike at Dover.—I received a great gray shrike, in the flesh, from Dover, on the 14th of November. It had only one white spot on the wing, and the breast is marked with numerous grayish semilunar lines; hence I conclude it is a female. Mr. Stevenson remarks ('Birds of Norfolk,' p. 62) that he has examined old females which showed no trace of these semilunar markings, and were exactly like males, with, I presume, two white spots on the wing.—*J. H. Gurney, jun.*

Great Gray Shrike in Norfolk.—A male specimen of the great gray shrike was killed, on the 10th of November, at Martham. Its stomach was filled with the feathers and bones of some small bird and a grain of wheat—no doubt from the gizzard of its prey.—*T. E. Gunn.*

Piebald Variety of the Ring Ouzel.—In the early part of October a singular variety of the ring ouzel was shot at Gunton, near Lowestoft. It is an adult male, with a perfect white gorget: the feathers of the throat are deeply margined with ash-gray, intermixed with a few white ones, and from the angle of the mouth on each side a white longitudinal patch extends, giving the bird the appearance of having a moustache.—*Id.*

Golden Oriole near Faversham.—A female specimen of the golden oriole was shot in an orchard near Faversham early in the autumn. The man who shot it stated that it was in company with another bird of the same species.—*John Hunter.*

Variety of the Robin.—I have a beautiful variety of the robin. The head and neck are of the usual colour; the breast red, mottled with white; back suffused with white; wings tipped with white, with two or three wing-coverts white; some of the wing-coverts tipped with red; rump white; tail with two white feathers and four others tipped with white. Although the bird was shot I have made a good specimen of it. It was killed on the 7th of December, 1868, at Ipswich.—*T. Last; Borough Road, Ipswich.*

Firecrested Regulus at Brighton.—A specimen of the very rare visitor, Regulus ignicapillus, has been shot in this neighbourhood, and is in the hands of J. Pratt, the naturalist, of Brighton.—*T. W. Wonfor.*

Richard's Pipit at Brighton.—Four specimens of Richard's pipit have been shot in the neighbourhood of Brighton within the last month (November).—*Id.*

Shore Lark in Captivity.—I have in my possession a shore lark (*Alauda alpestris*), which was taken in a net under the cliff near Dover. With the specimen of Richard's pipit previously recorded in the 'Zoologist' (S. S. 1458) as having been captured near

here, it it intended to be added to our collection of Kentish birds. The bird is now to be seen in its cage in lively and healthy condition. The food given is canary and hemp-seed, which it eats freely and thrives upon. It is a male bird, and I intend, if possible, to keep it alive, in the hope of hearing its song. The markings are very brilliant (see description in Yarrell, vol. i. p. 402). I believe this is the first known instance of the shore lark having been captured alive in England.—*Charles Gordon; Museum, Dover, November* 23, 1868.

Sexes of Chaffinches.—We have had the usual large flocks of chaffinches in this neighbourhood, and although I know it is thought by our best authorities on Ornithology that the sexes separate during the winter, I am not satisfied as to that point. Every one who has an opportunity of seeing young chaffinches in their nests must be aware that all of them, as far as plumage is concerned, are females: this plumage they retain until the spring moult, so that, supposing each pair of chaffinches bred twice in the year, there will be to all appearances nine female birds to one male, calculating four to each brood: thus we should have but ten males in a flock of one hundred birds; that is, supposing the old males were present in the large flocks we see in the winter, which I believe to be the young birds of the year; hence the appearance of a flock being female birds. I cannot call to my recollection ever seeing a large flight of chaffinches that I could suppose to be composed entirely of male birds; and, moreover, if we see two chaffinches together at this time of the year, they are almost certain to be male and female, or if you go into any farmstead you will find both sexes feeding together in about equal numbers: this certainly does not look like separation of the sexes. I do not know if the experiment has ever been tried of catching a dozen or two out of the large flights we see at this season, and keeping them in an aviary until after the spring moult: if it were tried I think it would be found, instead of being of one sex, that the sexes were about equal in numbers.—*Stephen Clogg; East Looe, Cornwall.*

Common Crossbill near Taunton.—Three of these very irregular visitors were shot in this village on Friday, the 11th of December, and brought to me for identification: they were supposed to be some very extraordinary foreign birds. There were two in very fine red plumage, and one in the green plumage. Except these I have not seen or heard of any here since those mentioned by me, in the 'Zoologist' for 1865, as having been killed here about twenty years ago. Besides the three brought to me I have seen several specimens, all red ones, which had been brought to Mr. Bidgood, at the Museum at Taunton: they had all been killed near that town in the beginning of this month.—*Cecil Smith; Lydeard House, Taunton, December* 14, 1868.

Rooks and Rookeries.—At Trenant Park, in the parish of Duloe, the seat of Mr. W. Peel, about a mile and a half from Looe, a rook, with three or four of the outer primaries of each wing white, has built her nest each year on the same tree, and nearly on the same spot: the young ones, as far as I can learn, have never had any white on them. The rookery is close by the house, so that a strict watch has been kept, and orders given that the white-winged rook is not to be killed; I therefore hope she may be spared for some years yet. Can anyone account for the capricious choice of rooks as to their nesting-places? I can recollect this rookery for more than thirty years, and although there has been no change as regards the number of trees in the old rookery, yet the nests there are becoming fewer in number every year, and a new colony has been formed in a plantation about a quarter of a mile from, and in

sight of, the old rookery. In the same parish there is a rookery on the trees (about forty in number) forming an avenue from the main road to the rectory-house: in my youthful days, as well as I can recollect, there must have been as many as forty or fifty nests there; but without any change in the trees, excepting their growth, the number of nests have been decreasing: in the year 1866 they had dwindled to two: the following year the rooks had entirely forsaken the place, but this year four pairs returned and nested there. Why they should have left I am at a loss to conjecture, as the trees are in full vigour, and upwards of forty feet in height. I have always been inclined to doubt that rooks were carrion eaters, but during the very hot weather of the past summer my doubts were removed by seeing a number of rooks feeding off a dead sheep: there were many rooks on and about the sheep, within fifty yards of me, those on the sheep so plainly feeding that I can no longer doubt the fact; yet I believe they would reject carrion if they could procure their natural food. The rookeries of this neighbourhood are generally small: there are a dozen or more within a radius of seven or eight miles of this place, the largest I think being at Trelawne, where they average more than three hundred nests annually.—*Stephen Clogg.*

Great Spotted Woodpecker in Morayshire.—On the 16th of November, while engaged in a pine-wood here, hunting for the pupæ of Trachea piniperda, I saw a very fine specimen of Picus major, a species, I believe, very rare so far north as Morayshire. On the 1st of the same month I had a specimen of this bird sent me by a gamekeeper, who had seen several others: he told me the bird was quite new to him, and I have little doubt of their being all migrants from Norway, as they appeared about the same time as the woodcock.—*George Norman; Cluny Hill, Forres, N. B.*

Nidification of Woodpecker.—On the 8th of May last, knowing a woodpecker's nest, I enlarged the hole by cutting, &c., sufficiently to admit my arm, hoping to find eggs, but was disappointed. Two days after, on passing the spot and seeing the bird fly out of its hole, I put my hand in and found to my surprise two eggs. These I took, and, acting on the principle of "exchange no robbery," substituted blackbird's eggs. This exchange went on for the next three days. On the 15th, however, I found the blackbird's eggs, together with one of their own (laid that morning), turned out and broken. Nevertheless, next morning I took another egg from the nest, and not having one with me for substitution, I left the nest empty. On the 21st I got four more, having taken in all eleven, not including the one broken.—*G. W. P. Moor; Great Bealings, Suffolk, November* 13, 1868.

Great Black Woodpecker in Leadenhall Market.—I am indebted to Mr. Gatcombe (who has been successful in obtaining some of our rarest birds in the London markets) for an unskinned specimen of the great black woodpecker, obtained by him in Leadenhall on the 6th of November. Mr. Gatcombe supposes it was from Sweden, as it came with some capercaillie, but the dealer who had it said that it was consigned to him from Hull. The stomach was remarkably thin, and contained (as Mr. Cordeaux, who examined it, informs me) nothing but turpentine and insect remains.—*J. H. Gurney, jun.*

Great Black Woodpecker (Picus martius).—I lately received, through the kindness of Mr. J. H. Gurney, jun., the stomach of this bird to dissect. This stomach, the muscular coat of which was very thin, smelt very strongly of turpentine, and contained a dark, thick, oily fluid, which I believe was almost pure turpentine. It was well filled with insects, all of one sort: they are probably the larvæ of the snake-fly

(*Raphidia ophiopsis*) or some closely-allied species.—*John Cordeaux; Great Cotes, Ulceby, November* 18, 1868.

Great Black Woodpecker in Hampshire.—I have just received a letter stating that a great black woodpecker (male) was shot a few days since, at Benstead, in Hampshire. My informant (Smithers) had the bird in his hand before it was skinned. I am none the more certain, however, that it was shot at the place mentioned; for I have known many instances of rare British birds being sent to our markets in the flesh, and from the markets sent into the country for the purpose of deceiving the unwary. Still the statement may be true, and I will leave no stone unturned to ascertain if such be the case.—*John Gould, in a letter to Mr. Rodd.*

[I am much obliged to Mr. Rodd for permission to copy and publish the preceding note, and shall feel it an increased obligation if he, or Mr. Gould, or any lover of truth, will push the inquiry to a satisfactory conclusion. Anyone visiting Leadenhall Market so frequently as I do (being compelled twice a day to pass the entrance) will admire the unquestionable honesty of the dealers, as demonstrated by the excessive paucity of the records of rarities, which could so readily be obtained from that prolific source: prior to those which have been recently noticed in the 'Zoologist' (without any attempt to prove them British), it is marvellous how very small is the amount of records of rarities purchased in that great mart of Continental and British Ornithology. —*Edward Newman.*]

Late stay of Swallows.—Mr. J. H. Gurney mentions (Zool. S. S. 1479) the 26th of October as the last day on which he observed swallows this year near Totnes. I noticed them as late as the 8th of November in this neighbourhood, on which day I saw, I should think, at least a dozen: they were all birds of the year. The day was cold and dark, with half a gale blowing from the eastward.—*Gervase F. Mathew; H.M.S. "Britannia," Dartmouth, December* 8, 1868.

Late stay of Martins.—On walking down Old Town Street, Plymouth, about 4 P.M. on Thursday last (November 19th) I was surprised to see four martins (*Hirundo urbica*) flying about over the street and fluttering up against one of the houses in it, as these birds do when seeking a suitable roosting-place. On the morning of the following Saturday I noticed a couple more (or perhaps two of the four seen on Thursday) flying briskly about the houses in Brunswick Terrace, in the eastern part of Plymouth. It is not very unusual for flights of these birds to make their appearance in this neighbourhood early in November, a few weeks after those that passed the summer with us have left, but seeing individuals so late in the month as the 19th and 21st is, I think, sufficiently remarkable to be recorded in the 'Zoologist,' especially as the weather during the early part of the month was unusually cold for the season. During the past summer martins were very scarce in this neighbourhood.—*T. R. Archer Briggs; 4, Portland Villas, Plymouth.*

Scarcity of Martins in 1868 *in the Neighbourhood of East Looe.*—I have seen many notices of the scarcity of martins in various parts of England this year: the same scarcity prevailed here. In Pelynt, a small hamlet in this neighbourhood, are to be seen the remains of twenty-one nests, all of which I believe were occupied in the year 1867, and I know from personal observation there were but nine this year, a falling off of more than one hundred and ten per cent. If this proportion has prevailed throughout England, the falling off in numbers must be enormous. Swifts and swallows have been in average numbers.—*Stephen Clogg.*

Late Nesting of the Stock Dove.—I found on the 27th of September a stock dove's nest containing two eggs. This is, I think, unusually late, as I have found the nest as early as the 10th of April.—*E. C. Moor; Great Bealings, Woodbridge, Suffolk, November* 24, 1868.

American Bittern in Ireland.—I have to record the occurrence of a rare visitor to British shores: on the 18th of this month a female American bittern (*Botaurus lentiginosus*) was shot by a farmer on the banks of the River Fane, on the borders of Louth and Monaghan, about twelve miles north-west of the town of Dundalk. It was sent to me on the 20th, and is now in the hands of the curator of the Belfast Museum for preservation. Professor Wyville Thompson, of Belfast, writes to me that he has seen it, and that there cannot be any doubt of the species.—*Clermont; Ravensdale Park, Newry, November* 25, 1868.

Glossy Ibis in Norfolk.—The glossy ibis I recorded in the 'Zoologist' (S. S. 1423) was shot at Stalham by Mr. B. C. Silcock, of that parish.—*T. E. Gunn.*

Redthroated Diver in Faversham Creek.—Mr. Skinner, birdstuffer, of Faversham, shot a redthroated diver in the creek on the 11th of November. This bird was in moult: the primaries were only just appearing, but the red patch on the throat was faintly discernible.—*J. Hunter.*

Little Auk and Common Guillemot at Faversham Creek.—A male specimen of the little auk was shot whilst flying over Faversham Creek on the 7th of November; and on the 9th a common guillemot was shot at the same place, fully two miles from the open sea.—*Id.*

Sandwich Tern on the Norfolk Coast.—A splendid adult male of the Sandwich tern was shot on the Norfolk coast, at Bacton, on the 7th of October, and passed into my hands for preservation. It weighed ten ounces, and in total length measured sixteen and a half inches. Its stomach contained nearly the entire body of a sand-launce (head and tail missing), some fragments of bones, and some pebbles.—*T. E. Gunn.*

Terns and Gannets at East Looe.—About a dozen common terns visited us last month. The arctic tern is our most frequent visitor, but I have not seen any this year. Large numbers of gannets have also been seen in our bay this year—not a very common occurrence: it is remarkable that here I have never seen a bird of the year.—*Stephen Clogg.*

Glaucous and Iceland Gulls in Kingstown Harbour, County Dublin.—December 10th. Took my favourite walk down the west pier of Kingstown Harbour. Wind S.S.W., half a gale, the dregs of a southerly gale which blew during the previous night. A number of vessels had taken refuge in the harbour,—a whole fleet of trawlers,—so there was good feeding for the gulls: nevertheless, they were not plentiful, though I noticed the great blackbacked, the glaucous (one), the herring, the Iceland (one), the common, the kittiwake and the blackheaded gulls. Though their chief resort was amongst the craft, still occasionally they soared along the lee-shore of the pier in search of food: at such times the glaucous and the Iceland gulls flew very close to where I was. With a mere toy I sometimes carry I procured the glaucous gull as he soared over the pier, and I doubt not could have killed the Iceland gull, but could not have got him, so forebore to annoy the noble creature. The glaucous gull is in second winter, and, were it not for the pale quills, might pass for a female great blackbacked gull; though it is something smaller than a female of that species,

it is decidedly larger than a male herring gull, particularly in the beak. Flying it appeared a much darker or smokier colour than the young of the blackbacked and herring gulls; in fact, the breast and belly appear of a uniform clove-brown, like a skua—an extraordinary thing, considering it to be so delicately pale a bird in adult years. I could recognize it by its dull colour far oftener than by its white primary quills. The Iceland gull appeared a very pale bird, the wings frequently appearing snowy white.—*H. Blake-Knox; Dalkey, County Dublin.*

Little Gull near Yarmouth.—A specimen of the little gull was shot in the neighbourhood of Yarmouth on the 4th of October. It answers the description by Yarrell of a young bird of the year, and is doubtless a male bird: the sex, unfortunately, was not noted, it having been skinned by an amateur.—*T. E. Gunn.*

Kittiwake Gull near Faversham.—A kittiwake gull was caught alive in a horse-pond, about four miles from the coast, early this autumn.—*J. Hunter.*

Pomarine Skua at Exmouth.—On the 30th of September last I shot a specimen of the pomarine skua on the beach at Exmouth. When I first observed it the bird was in company with a flock of gulls at some little distance from the shore, but it afterwards left its companions and began circling over my head within easy range. It is a male specimen and in immature plumage. When shot it was blowing a heavy gale from the south-east, and had been for a day or two previously.—*M. S. C. Rickards; Clifton, November* 24, 1868.

Pomarine Skua and Forktailed Petrel near Faversham.—A specimen of the pomarine skua, in fine plumage, was shot on this coast on the 14th of November, and is now in my collection. The bird is an immature female, and answers very closely to Yarrell's description, excepting in the colour of the bill, cere and legs, which latter in my specimen is a clear chalk-blue, and the base of the bill and cere greenish white; nearly the whole of the fore toes and webs are black, but the hind toe and claw are the same colour as the legs. The tarsus measures in length two inches and three-eighths, which I think may make a good distinctive mark of species, as Yarrell gives the tarsus of Richardson's skua as one inch and three-quarters only. My specimen was very poor in flesh, and its stomach and intestines quite empty of food: its weight before skinning was only eighteen ounces. A specimen of the forktailed petrel was shot at the same place on the 3rd of October.—*J. Hunter.*

Fulmar Petrels at Scarborough.—Mr. Roberts, of Scarborough, sent me four fulmar petrels in the flesh on the 24th of November. They had been taken on board a fishing-yawl at sea, the men having caught some with hooks, others by the hand (on the deck of the vessel), while they were swallowing herrings. These birds are unusually plentiful on the Yorkshire coast this autumn: at Flamborough the fishermen say they have seen scores of them about thirty miles from land. On opening the stomach of one some semi-transparent seed-like substances were detected, such as are commonly found in the storm petrel, but larger, supposed to be the air-bladders of some species of sea-weed.—*J. H. Gurney, jun.*

Fulmar Petrel at Whitby.—On the 21st of November some fishermen caught a fulmar petrel at Whitby, which I had the pleasure of skinning. With regard to the fulmar's windpipe Professor Newton writes, "So far as I can judge from the examination of these dried specimens I think it is incorrect to speak of the structure as a 'double trachea'—at least to my mind that term does not give an accurate notion of it, and I should prefer calling it a 'divided trachea,' the windpipe being divided by a

membranaceous septum (in anatomical language), which, so far as I can see, runs along the whole length. This *septum* would seem to be a prolongation of the 'membrana semilemaris' (see Owen, Anat. of Vertebr. vol. ii. pp. 221, 222, fig. 102, h) which is found in most tracheas, but in a state which, compared with its development in that of the fulmar, might be called almost rudimentary."—*J. H. Gurney, jun.*

The Waterfowl in St. James's Park.—When, in 1836, a few gentlemen began to stock the lake in St. James's Park with waterfowl, the rough frequenters of the Park —men and women, as well as children—startled at the unaccustomed sight of the birds, destroyed them in immense numbers, and if any one more rare and curious than the rest appeared on the water, he was immediately made a special "cockshy" for stones and killed. A male smew (*Mergus albellus*), the first that was known within the memory of man to come alive into the London market, was bought one day in 1837, and turned out upon the lake. He went rushing up and down, now diving and erecting his wings, till he attracted a great crowd; but, alas! they perseveringly pelted him with stones till he died, within an hour of his first appearance on that watery stage. The Ornithological Society was formed, and once a week the committee received lists of the birds killed and wounded by missiles during the preceding se'nnight. The losses were so numerous, and the expense of replacing them so difficult to be met, that it was seriously debated whether the Society should not give up its enterprise, on acccount of what seemed to be the incorrigible habits of cruelty and mischief of the people. Happily it was resolved to persevere, in the hope that, after awhile, the public would become interested in the birds and no longer persecute and annoy them. Everyone knows that this hope has been completely realized. The Ornithological Society has stocked all the waters in the Parks with waterfowl; not only St. James's, but Hyde Park, the Regent's, Victoria and Battersea Parks; and nothing is more rare than any injury wilfully done to the birds.—*Macmillan's Magazine.*

Rare Birds in the Highlands.—A good many rare birds have been shot in the Highlands of late. Among other curiosities is a specimen of the skua gull, which was lately shot, by Mr. E. H. Sykes, at Inverernie, a place much further inland than this bird is usually found. A buzzard was shot at Flitchy last month; and a specimen of the great spotted woodpecker fell to the gun of Mr. R. Thorne, at Portmahomack. But the greatest curiosity of the week is a nutcracker, which was shot at Invergarry, in the heart of this county: Yarrell says it is so rare that he has gone to the trouble of recording all the specimens that have come under notice since it was seen by Pennant in 1766, and during that long time only about half a dozen are recorded. A beautiful specimen of the snowy owl was shot last week at Knockie, by Mr. Charles Peel: it measures four feet ten inches from tip to tip of wings, from the beak to the end of the tail two feet three inches, and is in splendid plumage: the last known to have been killed in these parts was obtained, about four years ago near the same place. Another extremely rare bird, the roller, was killed near Dornoch last week, by Mr. J. C. Ker Fraser. The roller is seldom met with in the British islands: it is a native of Africa, but early in the spring many of them make their way to Europe by Malta and the Mediterranean sea, returning in autumn; accordingly they are found in great plenty in Malta and other islands of the Mediterranean, where they are considered excellent for the table, and consequently are killed in great numbers and exposed in the markets for sale. Length of the bird thirteen inches;

the head, neck and wing-coverts are of a greenish blue colour; back chestnut; under wing-coverts pale bluish green; quill-feathers of a rich blue; tail same hue as neck, except the exterior feathers, which are furnished with black tips. A flight of great spotted woodpeckers appears to have scattered all over the country within the last few days: specimens have been received from Sutherlandshire, Ross-shire, Morayshire and remote parts of Inverness-shire. One morning lately some storm petrels were observed skimming along the water above the old wooden bridge.—*Inverness Courier.*

"*London Cod*" *in the Severn.*—There was a very fine fish, which I bought, caught in the Severn near Woolaston, a few days since: the man who caught it called it a "London cod:" it was very much like a salmon in make, being short and very thick. It was a light bright-looking fish, very large eyes and thick leathery mouth. It weighed 16½ lbs., and was in very fine condition, and proved capital eating. I am told that these fish have been frequently caught in the Severn, but this is the only one for the last three years. As it is a fish quite unknown to me, perhaps some one of the numerous readers of the 'Zoologist' will kindly put me in possession of its real name: it is evidently only known in this neighbourhood as "London cod."—*Edward Sweetapple; Cone Mill, Lydney, December* 8, 1868.

Bream-fishing in the Yare.—I beg to inclose the result of nine days' bream fishing in the River Yare, at Cantley. The fish were all caught near the Red House Inn, where the two fortunate fishermen were staying. The fish were carefully weighed at the conclusion of each day's sport, commencing Tuesday, August 4. First day, 125 lbs.; second, 112 lbs.; third, 117 lbs.; fourth, 85 lbs.; fifth, 66 lbs.; sixth, 194 lbs.; seventh, 77 lbs.; eighth, 75 lbs.; ninth, 82 lbs. Total, 933 lbs.—'*Field' Newspaper.*

Conger Eels in the Thames.—During the last few days a large number of conger eels have made their appearance in the Thames. One caught at Woolwich Dockyard weighed 48 lbs., and another caught in the Arsenal weighed 36 lbs.; while a third, caught by a gentleman off North Woolwich, weighed 28 lbs. 10 oz.—*Newspaper paragraph, November* 14, 1868.

Large Conger Eel in the Severn.—Conger eels are frequently caught in the Severn; one of 53 lbs. weight was caught on Friday last near Woolaston.—*Edward Sweetapple; November* 11, 1868.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

November 16, 1868.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Boston Society of Natural History,' Vol. xi., sheets 7—30; and

'Memoirs read before the Boston Society of Natural History,' Vol. i. Part 3; presented by the Society. 'Annals of the Lyceum of Natural History of New York,' Vol. viii. Nos. 15—17; by the Lyceum. 'Proceedings of the Essex Institute,' Vol. v. Nos. 5 and 6; by the Institute. 'Proceedings of the Entomological Society of Philadelphia,' Vols. ii., iii., and vi. Part 2; by the Society. 'Transactions of the American Entomological Society,' Vol. i. Nos. 1—4; by the Society. 'The Butterflies of North America,' by Wm. H. Edwards, Part 1; by the Author. Holmgren, 'Monographia Tryphonidum Sueciæ' and 'Monographia Ophionidum Sueciæ;' Curtis's 'Guide to an Arrangement of British Insects;' by J. W. Dunning.

Exhibitions, &c.

Mr. Bond exhibited a specimen of Tapinostola Elymi, captured on the Norfolk coast, near Yarmouth; a variety of Dianthœcia capsincola, bred in 1867 by Mr. Noah Greening, at Warrington, having the wings on one side abnormally coloured; seven specimens of Polia nigrocincta, bred in 1868 by Mr. Greening, from larvæ found in the Isle of Man, and the earthern case in which one of the pupæ had been enclosed.

Prof. Westwood announced that the Leucania exhibited by Mr. Briggs at the previous Meeting (Zool. S. S. 1487) had proved to be L. albipuncta, *W. V.*, a species new to the British list.

Mr. M'Lachlan read extracts from the 'Canadian Entomologist,' one recording the occurrence of Papilio Machaon in the Hudson's Bay Territory, the other relating to the naturalization in North America of Pieris Rapæ, which, recently introduced into Canada, had already spread southwards into Maine and Vermont.

Mr. Bond mentioned the occurrence of a swarm of beetles in Cambridgeshire. A correspondent, writing from Whittlesford on the 30th of September, 1868, said:—"Within the last few days, the road, the foot-path, the grass and the hedges from my house for about three-quarters of a mile, have been covered with them: there must be bushels of them, and although we have had showers, their numbers do not diminish." The species in question was Gastrophysa polygoni.

Mr. M'Lachlan exhibited larva-cases, and specimens of both sexes of the imago (winged males and wingless females) of Enœcyla pusilla, bred by Mr. Fletcher, of Worcester, an interesting addition to the list of British Trichoptera. The larvæ were terrestrial in their habits, feeding in mosses growing on the bark of trees, and had not any external respiratory organs.

Prof. Westwood exhibited drawings in detail of some remarkable forms of Hymenoptera. Amongst them were three new species of Trigonalys, two from the Amazons, one from Ceylon; a singular insect from the Amazons, the type of a new genus Nomadina; and a still more abnormal form from Hayti, to which the name Sibyllina ænigmatica was given, which Mr. F. Smith had regarded as an ant, Mr. Haliday as one of the Sphegidæ, whilst Prof. Westwood thought it more nearly allied to the Vespidæ; its long twelve-jointed filiform antennæ (in the female), notched or kidney-shaped eyes, the tri-lobed lower lip, and the flat wings (not folded longitudinally), seemed to connect it with the last-mentioned family. (See 'Transactions' for 1868, p. 327.)

Mr. F. Smith thought the insect had more characters in accordance with those of the ants than with those of any other family, and it certainly never occurred to him

that it was a wasp. The notched eye was found in Mutillidæ and Trypoxylon; and there were none of the Vespidæ in which the prothorax was not continued down to the insertion of the wings, in which character Sibyllina agreed with the Sphegidæ.

December 7, 1868.—H. W. BATES, Esq., President, in the chair.

The Secretary announced the death of Prof. Boheman, an Honorary Member of the Society: he died at Stockholm on the 2nd of November, at the age of seventy-two years.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Annales de la Société Entomologique de France,' 1867; presented by the Society. 'Journal of the Linnean Society;' Zoology, No. 44; by the Society. 'Stettiner Entomologische Zeitung,' Vol. xxix. Nos. 10—12; by the Society. 'Memoires sur la Famille des Carabiques,' and twenty-six other Papers, by the Baron M. de Chaudoir; by the Author. 'Etudes sur la Parthénogenèse,' par Félix Plateau; by the Author. 'A short Campaign against the White Borer (*Xylotrechus quadrupes*, Chevrolat,) in the Coffee Districts of Coorg, Munzerabad and Nuggur,' by Lieut.-Col. C. P. Taylor; by the Author. Newman's 'British Moths,' No. 24; by the Author. 'The Zoologist' for December; by the Editor. 'The Entomologist's Monthly Magazine' for December; by the Editors.

The following additions, by purchase, were also announced:—'Genera des Coléoptères d'Europe,' livr. 137—144. 'Record of Zoological Literature,' 1867, (Entomological Part).

Election of Members.

A. G. Butler, Esq., of the British Museum, and Dr. F. Buchanan White, of Perth, were elected Members.

Exhibitions, &c.

The Secretary announced that an exhibition of bees would be held at Milan, from the 10th to the 13th of the month, and would comprise a collection of all kinds of bees, honey, and instruments and utensils employed in apiculture, for which various prizes would be distributed. A silver medal was also offered for the best mode of taking the honey without destroying the bees.

Mr. Bond exhibited two specimens of Limenitis Sibylla, negroes, entirely black on the upper side; and three specimens of Polyommatus Adonis, one of which, a male, was remarkable for its extremely small size, another bore on the under side of the fore wings a number of broad bars of black, whilst the third, a female, was partly coloured like the male, the upper surface of the wings being dashed with bright blue, not shading off into the brown, but clearly and sharply defined.

Mr. Bond also exhibited the gynandromorphous specimen of Lasiocampa Quercus bred by Mr. Wilson, and mentioned at the Meeting of November 2nd (Zool. S. S. 1487).

Mr. Dutton exhibited a Catocala Fraxini, captured in an empty house at Eastbourne in August last.

Mr. Edward Saunders sent for exhibition a specimen of Crambus myellus (*Hübner*), a species new to Britain. It was found by Mr. E. N. Brown, on a blade of grass, near Aberdeen, in July last; and was nearly allied to C. pinetellus.

Prof. Westwood exhibited drawings, and read descriptions, of several exotic Hymenoptera belonging to the genus Aulacus. (See 'Transactions' for 1868, p. 327.)

Paper read.

A paper "On the Application of the Law of Priority to Genera in Entomology," by Mr. W. F. Kirby, was read by the Secretary.

The author observed that a very large number of the generic names now current are applied exclusively to insects which the proposers of the names in question never indicated as their types of the genera, to the exclusion of the real types, which were frequently placed even in other families. He presumed, and regarded it as an "axiom," that where no figure or other indication of type was given, the insect placed at the head of the genus was to be considered as the type, and that the first section of a genus was always to be considered typical. Thus Linnæus always placed the species Priamus at the head of his genus Papilio, and that species must be taken to be the type of Papilio: the consequence would be that Ornithoptera (*Boisduval*, 1836) would sink, and the present genus Papilio would receive the next oldest name, Amaryssus (*Dalman*, 1816), with Machaon for its type. Numerous other instances were given, to show the vast changes in the current nomenclature of Rhopalocera that would be required by a strict application of the law of priority to genera; the object of the author being to invite discussion, and ascertain the opinion of naturalists as to the desirability of attempting so to apply the law. He recommended that in future the type species of every genus should be indicated by some symbol, so that that species should always remain in the genus, however much the latter might afterwards be subdivided. Mr. Kirby, though he considered that an author was at liberty, when subdividing a genus of his own, to apply the name to any group of species comprised in it, provided he had not himself indicated any type, yet did not think it allowable for an author, in subdividing a genus of another author, to apply the name to any but the first section; and (if no type had been indicated by the first author) the first species of the first section must be taken as the type of the restricted genus. In conclusion, Mr. Kirby alluded to some difficulties in specific nomenclature; where the sexes of an insect had been described under different names simultaneously, he thought the rule was that the name given to the male should stand, whether that sex happened to be described a few pages before the female, or *vice versâ*.

The President doubted whether there was any such rule as that which was the whole foundation of Mr. Kirby's proposed revolution in generic nomenclature, namely, that the first species in a genus was to be deemed the type; and if any such rule were to be adopted for the future, it did not follow that it ought to be applied to the past: to give such a rule a retrospective operation would be productive of the greatest confusion and inconvenience.

Prof. Westwood had many years ago expressed the view, that where an author has by means of dissections, figures, or in any other way, indicated the particular species which he regards as typical of the genus, or which may be deemed to be the best embodiment of the idea upon which the genus is founded, *that* species is of course the type, and must be treated as such by subsequent authors; but where no such indication

is given by the founder, the first species in the genus is to be taken as the type, and ought to be so taken in any subsequent dismemberment or division of the genus. But the adoption of such a rule and the application of it retrospectively would cause so much confusion that the remedy would be worse than the disease; and he should be extremely sorry to see Mr. Kirby's theory carried into practice, to the subversion of established nomenclature.

Mr. A. G. Butler discussed several of the particular instances mentioned by Mr. Kirby, and dissented from his conclusions. He argued that Papilio of Linnæus was not a genus, but included the whole of the butterflies; Linnæus's generic divisions were his Equites, Plebeii, &c. Fabricius did describe genera, and usually indicated his type species: he was the first to describe Papilio as a genus, Priamus was not the type of the Fabrician Papilio, but the insects now known by the name Papilio did come within that genus as limited by Fabricius.

Mr. Pascoe thought that Linnæus and the older authors had no types at all: the notion of a type-species was of modern date: he saw no ground whatever for regarding the first species in a genus as the type: his notion was to discover the species which, at the time when the genus was first named, was, by reason of its size or its abundance or any other circumstance, most prominent amongst those which the author grouped together under the same name, and *that* insect he took to be the type of the genus. That the first species in the list could not be the type was conclusively shown by the fact that, in successive editions of his works, Fabricius in many instances placed different species at the head of the same genus, probably without any other guiding principle than that of putting the largest species at the head; the largest species of yesterday was deposed in favour of the later but larger discovery of to-day.

Mr. Stainton agreed with the previous speakers that the rule of priority could not be applied to genera in the manner suggested by Mr. Kirby; and he did not think that, in the absence of indication, the first species in a genus was necessarily the type. Take, for instance, the genus Tryphæna, of which almost every one would be ready to admit that Pronuba was the type; yet in almost every list the species Orbona was placed first, and Pronuba came about the middle of the genus. When the author has not indicated any particular species or section of his genus as typical, the subsequent author who subdivides the genus has the right to determine to what section of the old genus the old name shall be restricted, and his determination on that point ought to bind all future writers.

Mr. Janson agreed that the subsequent author has the right to allot the original name to any division of the original genus, but if he does so it is rather as a matter of courtesy to the original author than of right on the part of the latter to have the original name retained. Suppose the original description of Aleochara by A. is silent as to the tarsi; B. on revising the species congregated under that name finds a group of fifty species with four-jointed tarsi, and another group of fifty species with five-jointed tarsi; B. is at liberty, if out of courtesy to A. he chooses to do so, to retain the name Aleochara for either of the groups, though neither group is the Aleochara of A.; but since neither group alone is the Aleochara of A., B. is equally at liberty to give, and is logically more correct in giving, a new name to each of the groups, and so discard Aleochara altogether.

Mr. Frederick Smith (who observed that, on Mr. Kirby's principle, the honey-bee would cease to be an Apis), Mr. Edward Sheppard, Mr. J. Jenner Weir and Mr.

M'Lachlan, also remarked upon the intolerable inconvenience which would ensue from any attempt to put in practice the views advanced by Mr. Kirby.

With reference to the question of specific nomenclature, Prof. Westwood certainly understood the rule to be that, where the two sexes of one insect were contemporaneously described under two names, upon the ascertainment of their specific identity, the name of the female was dropped and that of the male was retained as the name of the species.

Mr. M'Lachlan inquired what was to be done when in different parts of the same book (not being a periodical, but issuing from the press in its entirety and complete) the same insect is described, or two forms which ultimately prove to be the same species and of the same sex are described, under two different names: both names being published at the same moment, neither can be said to have priority over the other.

Mr. Wormald thought that, under such circumstances, the less appropriate name of the two should be rejected; or if one of the described forms was the ordinary form of the insect and the other a mere variety, the name given to the ordinary form should be retained.

Mr. Dunning suggested that to this special case also were applicable all the reasons which in ordinary cases had necessitated the introduction of the artificial and conventional law of priority. The priority contemplated by that rule was doubtless priority in point of time, and not of place or position; but when there was perfect simultaneity, the ordinary rule of priority failed, and required to be supplemented by some other and additional rule of easy and absolute application. Time failing to answer the purpose, space may serve to supply a criterion. Though p. 5 and p. 50 are published together, the former is before the latter; and in the case supposed the law of priority in point of time may conveniently be supplemented by a secondary law of priority in respect of place.

Reverting to generic nomenclature, Mr. Dunning thought the result of the discussion might be summed up as follows:—(1) that the prevailing opinion was against the existence of any such rule as that supposed by Mr. Kirby—that the first species in a genus was the type; (2) that the Members present were unanimously adverse to the retrospective application of any such rule, which, if adopted at all, could not be confined to any one group, but must be of general application to every branch of Natural History; (3) that on the division of one genus into several, in the absence of indication of type by the founder, the author who divides the genus has a right to determine to which division the original name shall be restricted; and (4) that, in the view of the majority, the original name ought to be retained (as of right, and not out of mere courtesy) for some section of the original section. To these conclusions Mr. Dunning expressed his assent.*—*J. W. D.*

---

* I suppose we are all agreed that where the first describer of a genus indicates which particular insect he regards as typical of the genus, that indication is binding on future describers, and so long as the name is retained as the name of a genus at all it must include the particular species so indicated.

The indication of typicality may be either express or implied. If the latter, evidence either intrinsic or extrinsic, positive or negative, is admissible to ascertain

the author's intention; we may and ought to resort to any and every source or means of information to determine what species presents the most perfect embodiment of the idea which was in the mind of the founder, and possesses the most perfect development of the characters which the founder has assigned as distinctive of his genus. The publication of figures and dissections of a particular species; the predominance of an insect at the time and place when and where the author wrote, either by reason of its size, beauty, abundance, destructiveness, or any other prominent trait; or the very name given to the genus, may frequently serve as sufficient indication. Thus (to take an instance referred to by Mr. Kirby) the name Polyommatus shews that Latreille had in his mind's eye the species which bear on their under surface the numerous eye-like spots distinctive of our "common blues," and he gives a figure of P. Corydon; yet most modern classifiers, neglecting these indications, place the polyommatous or "many-eyed" species in the genus Lycæna, and apply the name Polyommatus to species which have no eye-like spots at all. In the case of a genus which is originally established on a single species, the negative evidence afforded by the non-indication of other species as belonging to the genus, is almost tantamount to an express indication of typicality.

But (to come now to Mr. Kirby's paper), when the founder entirely omits to give any indication, is the first in his list of species necessarily to be taken as the type-species? is the first section of the genus necessarily the typical section? Mr. Kirby's proposed reform is based entirely on this proposition, which he terms an "axiom." But instead of being axiomatic, either self-evident, or an established proposition, I think it is capable of distinct disproof; and that so far as Linné, Fabricius, and the older authors are concerned, it can be shown to demonstration that in many cases, whilst they have not indicated what *was* their type, they *have* indicated that their first species, or first section, was *not*. In the first place, an insect that is once the type of a genus must ever remain the type; yet (as mentioned by Mr. Pascoe) Fabricius, in the successive editions of his works placed different species at the head of the same genus, and (if my memory serves) Linné did the same. Again, the species of which dissections, &c., are given are frequently not the first species in the genus. And (what seems to my mind decisive on the point) look at Linné's description of Cimex: "*alæ* quatuor, cruciato-complicatæ: superioribus anterius coriaceis:" the first section of Cimex is "*apteri*," and at the head of the genus is the wingless C. lectularius. The notion of a wingless insect being the type of a four-winged group is somewhat amusing! I believe other instances, not quite so startling, but in principle the same, might be adduced in abundance; but Cimex, if it stood alone, is enough to show that, so far as Linné is concerned, the notion of taking the first species, or first section, as the type, is simply the reverse of what the author intended. It may be that the Cimex of Linné (as was argued by Mr. Butler respecting Papilio) is not properly a genus at all; but whatever it be, it must I think be clear that in the contemplation of Linné himself, the first section or species of Cimex was not his type of Cimex.

In a detached paper, containing descriptions of genera taken haphazard and at random, there may be some presumption in favour of the notion that the species first described is typical of the genus; and even in a complete systematic work, there may be a slight presumption in favour of the typicality of the first species of the genus which (like Papilio) was placed (as it were) at the top of the tree. But as regards any other genus than the first in the list, it seems to me that in a systematic work or

catalogue the presumption would rather be against the first species; for suppose three genera, A, B and C; the arrangement being necessarily linear, and following the affinities of the species, the first species of genus B would be that which most nearly approached genus A, just as the last species of genus B would be that which most nearly approached genus C; and it would be neither at the top, nor at the bottom, but about the middle, of genus B, that we should find the species of B which was most different from both A and C, which species would presumably be the ideal representative of genus B, would presumably have that aggregate of characters which constitute the genus B, and distinguish it from A on the one hand and from C on the other.

I hold therefore, not only that Mr. Kirby's rule is inappropriate to the past, but that it would be an unhappy rule to adopt for the future.

I conceive that the practice hitherto has been a tacit recognition of the proposition enunciated by Mr. Stainton—that when a genus (of which no type has been indicated) comes to require division, the author who performs that operation is the person with whom it lies to decide which of the dissevered parts shall retain the original name. This practice has worked pretty well in the past, and will suffice for the future. I apprehend that the evils which have arisen in the past have been caused by the fact that the separatist, failing to recognise the original author's indications of typicality, has applied the rule to cases which were not properly within its range. But assuming that the separatist has not disregarded the original author's indications, or in other words that the case was a proper one for the application of the above rule, then I hold that his determination ought to be final and conclusive on writers subsequent to him, and is entitled to the full benefit of the law of priority.

But whilst agreeing to the above proposition, Mr. Janson goes a step further; whilst leaving the second author at liberty, he frees him from any obligation, to retain for either division the name given by the first author. And I believe some naturalists go a step further still, and say that the second author ought not to retain the original name as the name of either division, but should give a new name to each division. That is to say, because we cannot call by the name of Papilio *all* the species which Linné included under that name, therefore we shall not call *any* of the species by that name. It is quite true that the Papilio of Latreille is not co-extensive with the Papilio of Linné; the Papilio of this century is only part of Papilio of the last century; to the characters, as given by Linné, admitting a very wide range of forms, Latreille has superadded other characters, possessed by some but not by all those within the Linnean range; the effect is to restrict the application of the name to a part only of the insects which Linné recognised under the term Papilio; but every species of the Papilio of Latreille *must* be a species of the Papilio of Linné, not necessarily known to Linné, but within the description given by him. Florence remains an Italian city notwithstanding that Mentone has been taken from Italy. Machaon may remain a Papilio notwithstanding that Priamus has been removed. There is no misapplication of the name Papilio—only a narrowing of its application.

Consider the consequence of the rejection of the older name, instead of the restriction of its limits. Genus A is divided into two; each receives a new name, B and C: there is no longer a genus A. A few years later B and C are subdivided, B into D and E, C into F and G: there is no longer a genus B or a genus C. A few years later the same process is applied to D, E, F and G: these in turn are discarded,

and give place to H, I, J, K, L, M, N and O; and these again make way for the rest of the alphabet. There is an end to all stability or permanence of generic nomenclature. At the present rate of discovery of species and publication of genera, there would not be in use twenty years hence a single generic name which is now employed.

I care not whether it be called Papilio of Linné, or of Latreille—in fact, the genus, as now understood, is not exclusively due to either, but is the result of the work of both. To Linné we owe the name, to Latreille our present conception of the genus. But to whomsoever the credit (such as it is) may be due, I hope that so long as genera are recognised at all, so long will there be a genus Papilio.

Hitherto we have discussed the division of one genus into two or more. The converse case, of the aggregation of two or more genera into one genus, has recently been discussed (in the Ann. and Mag. Nat. Hist. 1868) by Mr. Pascoe and Messrs. Douglas and Scott. Mr. Pascoe objects to "giving new names to such genera as are formed by the union of two or more genera of a preceding writer." Messrs. Douglas and Scott reply that "it cannot be said with any truth that the name of a thing should be retained for another thing which is differently constituted, but of which the former may be an ingredient. A chemist when he combines two or more elements does not give the name of any one of them to the resulting compound; neither can it be rightly done in the labours of the naturalist." Illustrations of this sort, which are not arguments, are often delusive, never conclusive: probably those I am about to give are as much so as the above illustration of my friends. But to my mind the grouping together of two things under one name may be more aptly illustrated by a geographical than by a chemical simile: the question is one of boundaries, not of constitution or composition, or chemical amalgamation. France remained France notwithstanding the acquisition of a piece of Italy; Prussia remains Prussia, though it has absorbed the whole of Hanover. The limits are changed, but the name is not; a Nizzard is now (nominally) a Frenchman, a Hanoverian is now (nominally) a Prussian. If an author has established two so-called genera, A and B, and subsequent authors come to the conclusion that, whilst A is a good genus, B has not sufficient distinctive characters to entitle it to rank as a genus apart from A, surely the least inconvenient course is to take A as the name of the whole, rather than abolish A and B, and impose a new name, C. And (in this case, at all events) there is no impropriety in applying name A to the whole group; the ground on which it is done being this, that B is in fact part of A, and was erroneously severed from A; it never ought to have been made a genus, and the name therefore is properly sank, when the supposed genus to which it was applied is found to be untenable as a genus. On the other hand, I am quite ready to admit that in other cases it may be more convenient to give a new name to the united group; England and Scotland are united into one kingdom, but it is not the kingdom of England, or the kingdom of Scotland, but the kingdom of Britain. So (without any insinuation that either England or Scotland could not stand alone) if an author has established two so-called genera, A and B, and subsequent authors come to the conclusion that neither A nor B can stand alone as a genus, but yet that the two combined do properly form a genus, neither name has any better claim to retention than the other, neither represents a genus, and there seems nothing for it but to sink them both, and give a new name C to the genus, which is then in fact for the first time indicated as a genus.—*J. W. D.*

The Death of Species. By EDWARD NEWMAN.

"Il ne change qu'en mourant."

(Continued from S. S. 1395.)

CHAPTER III.—ON THE DECAY OF THOSE HUMAN RACES WHICH INHABIT THE SHORES OF THE MEDITERRANEAN.

IT will have been observed that the races to which I alluded in the previous chapter, the Guanches, the Newfoundlanders, the Tasmanians, the Australians, the Red Indians, have left us no legacies in the shape of books, buildings, statues or paintings; and certainly will leave us none, although some of them may yet exist for centuries. Their history, such as it is, must be written by aliens; some, as we have seen, enthusiastic friends, others as decided enemies: and it may be observed that races which could not make any mark to show where they had been, are not likely to be so highly esteemed by posterity as those who have written a history with their own hands. The races who have done this are now to be considered, and we shall see whether arts and arms, the highest intellectual power, or the most wonderful prowess in war, can prolong existence, or serve in any degree as a means of escape from the reign of law. It seems desirable in this, and also in the following chapter, in which I shall treat exclusively of the existent and widely-scattered Jews, Kelts and Saxons, to abandon the word "species," leaving it to be resumed hereafter: I do so under the impression that any word or phrase implying a foregone conclusion, while the inquiry is still pending, savours too much of that false logic which is appropriately called "begging the question." I admit, indeed lament, that other terms in ordinary use, such as "race," "family," "nation," "tribe," &c., are vague to a fault, but I infinitely prefer the vague to the dogmatic.

I trust I have shown in the preceding chapters that species of animals, exactly the same as individual animals, and races of men, exactly the same as individual men, have submitted, because they could do no other, to the law of death: I think it will be an equally easy task to show that other races of men have submitted, also because they could do no other, to the operation of that law in the depauperation, degeneration, deterioration, which is the unmistakable evidence of eventual dissolution. Mr. Darwin fully admits the existence of dead or dying branches of the universal tree of animal and plant life; but

he evidently regards such dead and dying branches as exceptional, indeed as facts running counter to the general law of evolution; to me they appear the evidence of a law diametrically opposed to that of evolution, namely, the law of death. Who has not felt, when following a member of his family to the grave, that to this end all his family must come at last? and when he observes other members of his family growing oblivious, gray, toothless, deaf or blind, does he not regard these ailments as unquestionable symptoms of decay—as certain precursors of approaching death? I feel in my own enfeebled body and mind that I am an exemplification of this law; that I am myself one of these

"Poor human ruins tottering o'er the grave."

Extending the principle from individuals to families, from families to tribes, from tribes to races and nations; from the dead Guanches, Newfoundlanders, Caribs, Tasmanians, Toltecs, and the dying Australian and Red Indian, to the Assyrians, Phœnicians, Ethiopians, Egyptians, Copts, Carthaginians, Greeks, Romans, indeed to the ancient world, his must be a singularly obtuse mental vision that cannot perceive all around him the evidence of approaching dissolution.

If I have not entirely misread and misunderstood all that Messrs. Darwin, Spencer, Huxley, Lubbock, Wallace, Hooker, have written on this most interesting subject, these philosophers, without exception, regard all living beings as gradually, perhaps imperceptibly, progressing towards a better, higher and more perfect state of both mind and body than that which they at present enjoy. I am compelled to include the consideration of both mind and body, because both are introduced by the authors themselves; and if we admit the hypothesis of evolution at all, we shall find it simply impossible to fix the period at which mind first enters into that mysterious compound the creature man: the words "primordial cell," "monad," "protozoon," "zoon," "man," are but so many terms used by Darwinians to express points in a linear series of genetic beings of which perhaps the "primordial cell" may, in their estimation, be the first, and man the last up to the Now of this earth's history. The series is simply an extension of that chain of beings so familiar to us all, great-great-grandfather, great-grandfather, grandfather, father, self; or thus, monad * * whelk * * fish * * monkey * * man. Now most of these able reasoners would, I think, willingly admit that the primordial cell, the first member of the series, had "no soul to be saved," and that the last, the *egomet* or self of the

series, has an immortal spirit: it follows that at some point or other in the chain of beings this great change must have taken place. This vital question does not appear to have been considered by our Darwinian philosophers, but in the ascending graduated scale it seems pretty clear that the protozoon must be an inhabitant of earth, and man, in his final state, a denizen of heaven.

There is some little appearance of discrepancy in the mode of treating the changes that we have seen in progress. Mr. Darwin speaks of "the innumerable species inhabiting the world as having been modified so as to acquire that perfection of structure and coadaptation which most justly excites our admiration;" but he goes on to say, "Naturalists continually refer to external conditions, such as climate, food, &c., as the only possible cause of variation. In one very limited sense, as we shall hereafter see, this may be true; but it is preposterous to attribute to mere external conditions, the structure, for instance, of the woodpecker, with its feet, tail, beak and tongue so admirably adapted to catch insects under the bark of trees." Wilson Armistead, who so fondly and lovingly dwells on the upward progress of the Negro, attributes, on the other hand, all structural modifications to external causes, setting in array a multitude of instances, in which animals are changed in form, colour, size and economy, by external conditions of latitude and longitude, heat and cold, light and darkness. Mr. Darwin modifies all this, and admits to the full the difficulty of understanding how "a simple being or a simple organ can be changed and perfected into a highly developed being or an elaborately constructed organ;" but he devotes an entire chapter to explain that the change does take place; and he subsequently declares, as a matter established beyond all doubt, that this evolving and improving process is an inherent principle of life, and in no way dependent on externals or casualities, the effects of which he also fairly and dispassionately considers. Near the close of his original work, Mr. Darwin thus expresses himself: "As all the living forms of life are the lineal descendants of those which lived long before the Silurian epoch, we may feel certain that the ordinary succession by generation has never once been broken, and that no cataclysm has desolated the whole world. Hence we may look with some confidence to a secure future of equally inappreciable length. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection."—'*Origin of Species*,' p. 489.

I select this from a multitude of parallel passages, because it so distinctly asserts that all living forms of life are descended from ante-Silurian progenitors: now as the Silurian fossils are pentacrinites, trilobites and sea-shells, and as man is a living form of life, this passage could not be rendered more explicit if it positively stated that Newton, Shakespeare and Darwin were lineal descendants of a pentacrinite, a trilobite and a whelk; nor do I suppose Mr. Darwin would for a moment shrink from this somewhat syllogistic mode of stating his own hypothesis. He evidently regards the principle of evolution as acting quite independently of all external conditions whatever, and even as though such external conditions had no existence. Other authors, thoroughly imbued with these views of progress, seem to differ as to their applicability to both "corporeal and mental endowments." Herbert Spencer, one of the most profound thinkers and most lucid writers of our day, thinks that the principle of Natural Selection ensures "a constant progress towards a higher degree of skill, intelligence and self-regulation—a better co-ordination of actions, a more complete life."

Mr. Wallace seems to believe only in this mental progress, this spiritual ascent towards a state we are wont to regard as angelic, for he expresses a most decided opinion that "the body of man has become stationary, and that his future improvement is to be confined to the mind;" and Sir John Lubbock says that "the future happiness of our race, which poets hardly ventured to hope for, Science boldly predicts. Utopia, which we have long looked for as an evident impossibility, which we have ungratefully regarded as too good to be true, turns out, on the contrary, to be the necessary consequence of natural laws, and once more we find that the simple truth exceeds the most brilliant flights of the imagination."—'*Prehistoric Times*,' p. 492.

This reads at first as rather too enthusiastic, but the well-considered paragraph, which I shall next cite from the same accomplished author, may serve as ballast to the very sanguine anticipations here expressed, for we find it sets forth, with the utmost candour, that no progress has been made during the historic period, a period certainly exceeding four thousand years.

"We find on the earliest Egyptian monuments, some of which are certainly as ancient as 2400 B.C., two great distinct types, the Arab on the east and west of Egypt, and the Negro on the south; and the Egyptian type occupying a middle place between the two. The representations on the monuments, although conventional, are so extremely

characteristic that it is quite impossible to mistake them. These distinct types still predominate in Egypt and the neighbouring countries. 'Thus, then,' says Mr. Poole, 'in this immense interval we do not find the least change in the Negro or the Arab; and even the type which seems to be intermediate between them is virtually as unaltered. Those who consider that length of time can change a type of man, will do well to consider the fact that three thousand years give no ratio on which a calculation could be founded.' I am, however, not aware that it is supposed by any school of Ethnologists that 'time' alone, without a change of external conditions, will produce an alteration of type. Let us now turn to the instances relied on by Mr. Crawfurd. The millions, he says, 'of African Negroes that have during three centuries been transported to the New World and its islands are the same in colour as the present inhabitants of the parent country of their forefathers. The Creole Spaniards, who have for at least as long a time been settled in tropical America, are as fair as the people of Arragon and Andalusia, with the same variety of colour in the hair and eye as their progenitors. The pure Dutch Creole colonists of the Cape of Good Hope, after dwelling two centuries among black Caffirs and yellow Hottentots, do not differ in colour from the people of Holland.'"

But this is not all: perfectly true it is that the body has exhibited no alteration, and that the mind has not advanced; but is it equally true that the mind has not retrograded? The Negro, Arab and Egyptian are well worthy of examination, but why not extend the inquiry to neighbouring and kindred nations, to the Assyrian, Phœnician, Carthaginian, Roman, Greek? Shall we not find it impossible to deny that in them, indeed in every historic and civilized race, there is evidence of retrogression? I will go a little more into detail.

NEGROES.—I believe our best ethnologists would agree in assigning to the Australasian natives the highest antiquity, and on the principle of evolution we might expect to find them the most advanced in the evidence of mental culture; but history ignores them altogether, so that we are compelled to commence with the Negro. The country of the Cushites, strange as it may appear in the instance of so great a people, has been a subject of doubt and controversy: they certainly travelled northwards in their wonderful invasions of Judæa, and whether from the east or west of the Red Sea matters little to my theory. Herodotus describes two races, Asiatic with straight, and African with woolly, hair. Kitto justly supposes the term Cushite of the Hebrew,

Aithiops of the Greek, and Æthiops of the Romans, to be applied to those black people inhabiting the country south of Egypt, and now generally known as Negroes; the word Ethiopian conveys one only meaning, people having a black countenance or skin. The question in Jeremiah, "Can the Cushite change his skin?" implies that he possessed a skin differently coloured from that of the Israelite, and I know of no theory that seems to controvert this point. The Jewish chronicles always represent the Cushites as a most formidable people, a people whose military prowess was equal to their numbers, and whose attacks could only be resisted by the express intervention of the Almighty: it seems to be unhesitatingly admitted that the unaided arm of the Hebrew was totally incompetent to arrest their northward progress, and that the Almighty alone could successfully contend with them. We find in the second book of Chronicles the record of two Negro invasions of Judæa on a scale of magnificence that the Napoleons and Wellingtons of our time might read of with envy. In the fifth year of the reign of king Rehoboam, Shishak, king of Egypt, came up against Jerusalem with twelve hundred war-chariots, and sixty thousand cavalry, and infantry without number; they were Lubims and Sukkiims and Cushites: this army took possession of all the cities of Judæa; it pillaged the temple of Solomon and the palace of Rehoboam, and carried away the shields of gold which Solomon had made: and the children of Israel became the slaves of the Negro: this was a thousand years before the Christian era: the date in the margin is B. C. 972. A second invasion took place about twenty years later under Zerah the Cushite, and in this instance no mention is made of auxiliary forces. Since the previous invasion the Israelites, under Asa, the grandson of Rehoboam, had built and fortified a number of strong cities purposely to resist these formidable invaders: Asa had also raised and disciplined an army of five hundred and eighty thousand men. Such was the prepared state of Judæa when the second great invasion of Negroes took place, when Zerah came up out of Ethiopia with a million of armed Negroes and three hundred war-chariots, and "cattle and sheep and camels in abundance," which shows how thoroughly the Negro then understood the commissariat department; the cattle and sheep being provided for food, the camels for transport. The very simple Scripture narrative conveys the idea of the most consummate organization, the almost boundless resources of the Negro.

Here it has been objected that the numbers used by the Hebrew historian in the books of Chronicles and Kings are greatly exaggerated;

but the text itself does not bear out this: there is a precision in the way in which minor numbers are given that carries conviction to every truth-seeker: thus it is stated that Abijah began to reign in the eighteenth year of king Jeroboam; and that he reigned three years in Jerusalem, and that he had fourteen wives, twenty-two sons and sixteen daughters. It is also worthy of note that the average reign of each king chronicled with so much care correspond very closely with that of the kings of England or European nations generally, showing that the duration of human life was much the same then as now; and the number of wives and children will find its parallel at the present hour in Palestine.

It has been asserted, but never demonstrated, that "Cush" in the Hebrew is not the equivalent of our "Negro;" but I entirely agree with Dr. Kitto in thinking it difficult to understand how any ethnologist could possibly have entertained a different opinion: there is not a single passage in the Bible in which "Cush" cannot be fairly understood to mean Ethiopia; and "Cushite," Negro.

In all ages of the world proficiency in war seems to have been considered the chief good, the great desideratum: it certainly was so in Judæa, and it certainly is so now: our national debts all the world over are incurred with this single object: our expenditure for education, science, art, philanthropy, or in any way for the good of our fellow-creatures, is so infinitessimally small that it bears no appreciable proportion to our expenditure for war: it is therefore, in estimating the character of the Negro three thousand years ago, that I place war first in the category of his accomplishments. But let it not be supposed the Negro of that date was a mere fighter: the city of Meroë, the capital of Ethiopia, to this day contains splendid ruins of temples and other edifices that have excited the admiration and employed the pens of Caillaud, Gau, Ruppell, Belzoni, Waddington, Hoskins, and a host of other accomplished travellers. What is the Negro now, after the lapse of three thousand years? I hear the philanthropist reply that slavery has degraded him; but is this shown by fact? What is the testimony of those outspoken opponents of slavery, Baker, Livingstone, Speke, Grant, Petherick? they have rendered themselves perfectly familiar with the Negro in his home. Notwithstanding all its horrors, slavery has clothed and taught and fed the Negro, and yet neither in a state of servile bondage nor as a free inhabitant of his native morasses, does he bear a comparison with the Negro of Scripture history: he cannot fight a

battle, he cannot build a bridge: with the elephant, the most docile of all animals, at his very doors, he cannot utilize the powers of that invaluable animal. I must not omit this opportunity of expressing my opinion that the horrible system of Negro Slavery has been a perpetual curse to the white man; always lowering his standard of morality; always striking at the root of his Christianity.

EGYPTIANS.—However we may lament the almost entire absence of authentic historic records respecting the Negro, except from the pens of decidedly hostile historians, as Jewish and Egyptian, to both which peoples he was a scourge and terror, we have no such difficulty with his neighbour the Egyptian, who would seem to vie with the Negro, both in antiquity and importance. Herodotus, the father of history, B.C. 450, Thucydides, who lived at the same period, Manetho, the Egyptian priest, B.C. 304, Eratosthenes, a Greek philosopher, B.C. 250, Diodorus Siculus, a Roman of the Augustan age, as well as Ælian, Strabo, Plutarch, Pausanius and Philostratus, seem to have made it their especial mission to corroborate that adamantine record left by the Egyptians themselves in their temples and their hieroglyphics. With the first glimmer of history after the Cimmerian darkness of prehistoric ages, we find Egypt grandly bursting through the gloom. The origin of this people is by some modern historians deduced from a son of Noah, but Bunsen has shown that Menes the Great reigned over Egypt 3555 years before Christ, and therefore 1207 years before the deluge, and that a succession of monarchs occupied the throne from Menes to Cleopatra. Dr. Lepsius, who has devoted an almost incredible amount of learning and industry to the inquiry, assigns to Menes a still more remote date, while Dr. Kitto, the great biblical scholar, is disposed to cut down this wonderful antiquity, in order to bring it more in accordance with the chronology of the Bible. This question, deeply interesting though it be, is one for theologians and historians, rather than for the naturalist, to whose particular science it is altogether unimportant whether the Egyptian monarchy was in the zenith of its glory two, three, four or five thousand years before the Christian era. The Bible, a hostile although truthful witness, mentions "Egypt" and "Egyptian" two hundred and fifty times, and there is scarcely a single mention but conveys the idea of vast supremacy. No poet laureate ever penned a pæan of victory with half the force that the book of Exodus describes the expedition of Pharoah in pursuit of the Israelites, and the utter destruction of his host in the Red Sea: "all the chariots of Egypt and captains over every one of them, and all the horses of

Egypt and all the horsemen;" and then the panic that seized the Israelites, and their prayer to Moses that he would return and let them remain the slaves of this mighty people, rather than await the coming of the irresistible force that pursued; and yet this is not written to exalt the Egyptian, but to exhibit, in all its grandeur, the power of the God of Israel.

Thus we find the concurrent testimony of historians, sacred and profane, raising Egypt to the very highest rank of dignity and importance; and did we not know the Egyptian as the creator of pyramids and temples, of Luxor and Carnac, of Philæ and Thebes, of Sphinxes and Memnons, of hieroglyphics, those adamantine histories that have defied the ravages of fire and sword, of Christian cannon and the insatiable appetite of time, no rational doubt could be entertained as to the greatness of a people that filled such diversified histories with their wondrous achievements. But we *do* possess this corroborative evidence, and these stupendous relics of the past still look down on us in serene and imperturbable majesty.

CARTHAGINIANS.—Possessing but a slight, a very slight, knowledge of fiction and romance, it may perhaps amount to very little my saying that I know of no romance so wild and improbable as the brief but authentic history of Carthage. It is a current belief, and has for at least two thousand years been taught in schools, that Carthage was a colony settled by refugees from Tyre: historians find support for this hypothesis in the legendary pages of Theocritus, and philologists in the language they suppose to have been Carthaginian; but real history deals with the subject in no obscure or mythic style; Carthage first illumines the historic page as the possessor of two hundred ships of war, each having five ranks of rowers on each side, and thirty rowers in each rank: thus three hundred oars were dipped simultaneously in the sea, and when we multiply this number by that of the ships, we find that a force of sixty thousand seamen was in constant requisition, and twenty-four thousand fighting men, or marines, were ready for active service on deck, without requiring any assistance from the rowers. Rome, then possessing the opposite shore of the Mediterranean, was the most powerful nation in the world, and it soon became manifest that two such powers could not coexist; neither Rome nor Carthage knew any bounds to her ambition. Carthage very early possessed herself of the greater part of Sicily, and shortly afterwards of all Spain; then came perhaps the most daring military exploit the world has yet witnessed. Hannibal led his victorious troops out of Spain, over the Pyrenees into

France, and then over the Alps into Italy. Rome was thunderstruck at the feat: and her commanders seemed paralyzed with fear: they continued for awhile to hover about the skirts of the Carthaginian army without daring to venture a battle: at last Varro took the field with 80,000 infantry and 6000 cavalry, probably the finest army a Roman general had ever led: the armies met, and the genius of the Carthaginian prevailed: Cannæ was fought and won, and Italy was prostrate at the feet of the Carthaginian, who remained unconquered by Rome, the so-called mistress of the world, for sixteen years. When the Roman at last recovered himself, when his terrific fiat at length went forth, "*delenda est Carthago*," Carthage became a Roman province, and is now but the shadow of a name.

ROMANS.—Where then are the Carthaginians; and where are her conquerors? Does not the very title of Gibbon's great work convey the clearest possible idea of that tribal decay which is directly at variance with evolution, progress, improvement? Gibbon was certainly no Darwinian; he looked on Rome and the Romans as having equally fallen into irretrievable ruin. *Ut nunc omni decore nudata, prostrata jacet, instar gigantei cadaveris corrupti atque undique exesi.*

GREEKS.—The Argives, also called Achaii, Hellenes and Greeks, and sometimes, but erroneously, Acarnanians, have made an impression on the literature of the world which grows deeper, and apparently more enduring, as century after century rolls over our heads. The history of Greece begins a thousand years before the Christian era, and ends or nearly ends with the Birth of Christ. Her warriors, poets, painters and historians still vie with each other as to which has the highest and best claim to the applause of the present age; and while we reckon it our noblest intellectual feat to produce a worthy translation of her poets and historians, or a faithful copy of her statues or temples, we feel an almost breathless admiration of the prowess, skill and indomitable courage which those poets and historians record. Greece first looms on us through the fog of fiction; and the Homeric version of the Greek triumph over the Assyrian race at Troy, is mainly remarkable as evidence of poetic genius: except by a few spirit-rappers, mediums and other impostors, the idea of physical force being employed by gods, demigods and spirits is not now entertained; yet it cannot be denied that the blind poet who imagined these transactions, founded a school or system of theology that made a deep and enduring impression on the minds of men; since we cannot refer the mythology of Greece and Rome to any other or earlier source than the teeming brain of

Homer. Of his transcendent merits it were idle to speak, for one of our own greatest writers has said that "beyond a doubt he was the most exalted and universal genius the world has seen." Subsequent Greek poets, as Æschylus, Aristophanes and others, are so eclipsed and overshadowed by the gigantic genius of Homer, that talent unequalled elsewhere, except perhaps among the Jews, seems dwarfed into insignificance. Of Grecian painters we know little, yet that little is very grand: Apelles lived in the time of Alexander, twenty-one centuries ago, and one of his pictures existed in the age of Augustus, and was purchased by that emperor to adorn the temple of Julius, by the remission of the entire tribute paid by the island of Cos, of which Apelles was a native: the picture was called the Venus Anadyomene, and represented the goddess as emerging from a shell floating on the ocean; but the skill of Apelles was not exhibited alone in painting the human figure, for he painted animals also, and dogs with so great truthfulness that living dogs are said to have supposed them realities, and stopped to quarrel with the inanimate canvas. Of Grecian Sculpture examples still exist, and the names of Phidias and Praxiteles have become synonymous with unrivalled excellence. Of Architecture the Temple of Theseus, and similar buildings which we have despoiled and defaced, still attest the supremacy of Greece. In History the names of Herodotus and Thucydides yet stand unrivalled, and in Astronomy that of Thales: twenty centuries ago that great philosopher calculated eclipses with a precision that induced some to worship him as a god and others to condemn him as a sorcerer. Aristotle has always been called the father of Natural History. Solon, Plato and Socrates are the great teachers of Moral Philosophy. Lastly, in War, the names of Troy and Thermopylæ, of the Granicus, Issus and Arbela, are sufficient evidence of the proficiency of Greece.

What is Greece now?

He who hath bent him o'er the dead
Ere the first day of death is fled,
The first dark day of nothingness,
The last of danger and distress,
(Before decay's effacing fingers
Have swept the lines where beauty lingers,)
And marked the mild angelic air,
The rapture of repose that's there,
The fixed yet tender traits that streak
The langour of the placid cheek,
And—but for that sad shrouded eye,

That fires not, wins not, weeps not, now,
And but for that chill, changeless brow,
When cold obstruction's apathy
Appals the gazing mourner's heart,
As if to him it could impart
The doom he dreads, yet dwells upon;
Yes, but for these and these alone,
Some moments, aye, one treacherous hour,
He still might doubt the tyrant's power;
So fair, so calm, so softly sealed,
The first, last look by death revealed!
Such is the aspect of this shore;
'Tis Greece, but living Greece no more!
So coldly sweet, so deadly fair,
We start, for soul is wanting there.
Hers is the loveliness in death,
That parts not quite with parting breath;
But beauty with that fearful bloom,
That hue which haunts it to the tomb,
Expression's last receding ray,
A gilded halo hovering round decay,
The farewell beam of feeling past away!
Spark of that flame, perchance of heavenly birth,
Which gleams, but warms no more its cherished earth!

Clime of the unforgotten brave!
Whose land from plain to mountain cave
Was Freedom's home or glory's grave!
Shrine of the mighty! can it be,
That this is all remains of thee?

Not all the writings of all the philosophers on earth can impair the lustrous truth of this wonderful passage: and again the same poet, addressing Greece, exclaims—

The hearts within thy valleys bred,
The fiery souls that might have led
Thy sons to deeds sublime,
Now crawl from cradle to the grave,
Slaves—nay, the bondsmen of a slave,
And callous, save to crime;
Stained with each evil that pollutes
Mankind, when least above the brutes.

And in another place he pertinently inquires—

Assyria, Greece, Rome, Carthage, what are they?
* * * their shores obey
The stranger, slave, or savage; THEIR DECAY
HAS DRIED UP REALMS TO DESERTS.

Byron, again, was no Darwinian; he could not discern symptoms of an approaching Utopia in any of the lands his hero visited: everything told him that, while earth, sea and sky retained all the attributes of beauty and power, man had dwindled.

The instances of decay which I have cited are familiar to everyone, and are but so many evidences of the "reign of law." If we extend the inquiry to the New World, the researches of Stephens in Central America, the pages of Robertson's History, the novels of Fenimore Cooper; none of them written with this object, all tend to show how universal is the law. The very title of the 'Last of the Mohicans,' like Gibbon's 'Decline and Fall,' is a faint but most ample acknowledgment of an irresistible truth. Objectors will say, In all these cases, the extinction, the decay, has been the result of violence: the Dodo, the Auk, the Egyptian, Carthaginian, Roman, Greek, Assyrian, Toltec, Mexican and Mohican, have met with a violent death. Yes: but why? Because, in their depauperated state, they could not hold their own; they could not maintain their ground. In almost every instance the wane has been slow and gradual, and the philosopher reading the 'Decline and Fall' and the 'Last of the Mohicans' may trace day by day the slowly weakening process of decay before the final blow came. As the giant oak that has stood immovable for a thousand years, and has braved ten thousand storms, submits, bit by bit, day by day, to the silent, the unseen attacks of minute insects, of rain-drops that follow in their tracks, of Fungi that feed on rottenness, and at last succumbs to some sudden blast, and falls: so has it been with every nation and with every people.

It has been said that there was something peculiar and exceptional in the decline of the peoples I have cited, and that there has been no subsequent instance of decadence. I doubt whether even this will hold good; I doubt whether a change is not coming over other peoples: we do not now fear an invasion of the Danes: we do not read of Van Tromp leading the Dutch up to the very walls of the Tower: we do not hear of Spain fitting out an invincible Armada or discovering and annexing a world. We do not read of the Moslems overrunning Europe. What is implied by the retreat of the Turks from Spain? What meant the term "sick man," applied by the late Emperor Nicholas to Turkey? Evolution, progress or what?

Authentic history finds every people in the zenith of its glory: probably that very glory is the primary cause of the historian's labours. Yet no people has ever been satisfied with the grand simplicity of truth;

no people has ever perceived the grandeur and all-sufficiency of that simplicity. All seek more fame: all yearn for the miraculous: all invent fables which posterity despises. One would have thought that Alexander of Macedon had written his name plainly enough on this globe of ours to satisfy the pride of his admiring countrymen; but it was not so: they invented for him a divine parentage. It was thus with Æneas. Again, it was insufficient for the Roman that he was universally admitted to be master of the world: the founder of Rome must be suckled by a wolf. It has been well said, there is but a step from the sublime to the ridiculous: all nations have taken that step. The remedy is now in the course of application. The truth-seeking spirit of the age is not only an antidote to the poison of fables that have been accepted as history, but to the hypotheses that have been grafted on fact. Hence the inestimable value of searching inquiry. Had all historic evidence been destroyed by the conflagration at Alexandria: had a series of earthquakes engulfed the remains of Nineveh, Thebes, Balbec, Palmyra and Athens: had not the printing-press multiplied, almost to infinity, our copies of the Bible, and of the works of Homer, Herodotus, Thucydides, Aristotle, Anacreon, Virgil: then indeed the enthusiastic Darwinian might have seated himself on a cupola of the National Gallery, and have been justified in pointing to our joint-stock hotels and railway-stations; to our railways and electric telegraphs; to the statues of our kings and the palaces of our poor; to the works of our Tuppers and our Tennysons; our Macaulays and our Carlyles; our Wests and our Lawrences; to our philanthropic associations and missionary enterprises; and might have exclaimed in exstatic rapture,—"Behold a people rapidly mounting upwards from the earth on which they tread towards the heaven to which they aspire! rejoice ye! rejoice ye! sing songs of triumph, pæans of self-adulation, that we are no longer the benighted savages our ancestors were: ours is the triumph of the mind: like the butterfly emerging from the chrysalis, we have attained a new existence, new powers, new organs of flight, we soar now above the earth on which we once crawled: we possess greater skill, higher intelligence, a more perfect self-control, a better co-ordination of action, a more complete life." There is nothing to interfere with this exultation unless it be the silent eloquence of those legacies which our remote ancestors have bequeathed to us.

EDWARD NEWMAN.

(To be continued.)

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1413.)

NOVEMBER AND DECEMBER, 1868.

Snow Bunting.—November 7. First observed; several seen flying over the "fittie" land near the Humber.

Tree Sparrow.—November 9. Amongst the many small birds now found in the stubbles are several flocks of this species. One flock which I find near the same place nearly every day numbers several hundred birds.

Shorteared Owl.—November 21. Put up one of these owls this morning from some ploughed land in the marshes. It is the only one I have seen this season.

Woodcock.—Have been remarkably scarce; I have seen none, and only heard of them as either shot or seen in the Humber district. These birds have also, so I am informed, been remarkably scarce in Holderness; very few have been exposed for sale in the Hull game-shops.

Fieldfare.—November 4. First seen, but very scarce, except during the last week in the month; in this week thousands arrived in the neighbourhood. On the 30th I observed more of these northern thrushes than I have ever before seen at one time in any previous season. Large flocks were constantly passing over from north to south during several hours; thousands were sitting grouped together on the grass-land after the manner of golden plover, for which birds I at first mistook them: many also of the detached hedges and solitary hawthorns swarmed with chattering crowds. I walked in the course of the day, in company with a friend, over a great extent of marsh-land, and everywhere saw large flocks; they were scattered here and there by hundreds and thousands over our marsh district. These birds were exceedingly wild and wary, and getting within shot was out of the question. These fieldfares were probably passing southward, as they remained only a few days in this district. Some large flocks, however, remain daily feasting on the abundant crop of haws, and wasting much more than they eat. They roost at some distance from their feeding-ground, in one of the small plantations near the "beck," containing a dense undergrowth of reeds and aquatic plants, overtopped by young larch and ash. I have often watched them between three and four o'clock on a winter's afternoon, coming into this cover, flying

at a great height, and dashing down suddenly when over the plantation; for a time they perch on the higher trees, and are very noisy: as darkness falls, they fly down by two or three together, into the gloom of the underwood, perching on the boughs of the larch, and not, as far as I can ascertain, roosting on the ground. Deep gloom pervades the lower cover before the last fieldfare has settled to his place. Then for a time there is silence; the white mist creeps upwards from the lowlands, and looking along the course of the stream we can see the plantation tops only, standing out like islands in a misty sea: then, just as the first stars become visible, we hear, but cannot see, the wildfowl passing over; we can distinguish the rush and whistle of the golden plover, the winnowing of the peewits, and the louder flight of wild ducks, and, perchance, before we leave our post of observation, there come some flying lower than their brethren; then the mist is riven by a double flash, and we walk homewards with a fat mallard tucked into each pocket. I believe some of the flocks of fieldfares nightly roosting in this plantation come from a considerable distance, even crossing the Humber, here from five to six miles wide, as I have heard them, late in the afternoon, when walking on the embankment, passing over in the direction of their general roosting-ground.

Golden Plover.—Extremely abundant, although, as usual, very variable in their movements: often for days we find scarcely any in the marshes, and then, before rain and wind, thousands may be seen, flock after flock careering backwards and forwards the day through. This is the time to shoot them, as they fly very low—in fine still weather far out of shot, sometimes undistinguishable, except from their note. These birds feed principally on earth-worms, the supply of which, notwithstanding the immense flocks of worm eaters of various species frequenting these grass-lands, is practically inexhaustible. I have often been astonished, on paring off a thin sod, at the large number of earth-worms exposed; they lie amongst the grass-roots close to the surface, and are thus easily accessible to the plover, starling and rook. The stomach of a golden plover opened lately contained a gray fluid, the remains of earth-worms, and several blades of grass. In six golden plovers recently examined I found three with the axillaries slightly edged and broken with gray. These feathers are not always uniformly white.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
January 2, 1869.

Ornithological Notes from the Isle of Wight.
By Captain HENRY HADFIELD.

(Continued from S. S. 1090.)

Partridge.—February 10, 1868. First observed in pairs. Partridges are scarce this season: owing to the hot summer the birds were strong on the wing by the 1st of September, and very wild, there being no turnips, clover, or cover of any kind for them.

Jackdaw.—March 2. The jackdaw is now paired.

Wheatear.—March 27. First seen to-day near Shanklin. Last seen, on the sea-cliffs, on the 4th of October.

Razorbill.—Was observed until the first week in April.

Swallow and Martin.—April 7. Three swallows observed to-day; there had been white frost on the 5th. Martins not observed by me till the 19th. On the 3rd of November I saw two or three swallows flying about the sea-cliffs at Shanklin; and on the 9th of December either a swallow or a martin, it being too distant to determine which. They generally linger about the sandstone-cliffs, near the Chine, long after the main body has migrated, and are, in mild winters, occasionally met with there and in the Undercliff as late as the first week in December. That these stray birds perish there can be little doubt, for if not immature or sickly they would have migrated at the usual time. Both swallows and martins have been scarce: the former are seldom found nesting in the Undercliff, but the latter usually breed here in considerable numbers; during the past summer, however, few nests were to be seen. Probably, owing to the long-continued drought, no material could be obtained; our chalky, friable soil, requiring much moistening and kneading before it can be rendered in any degree adhesive: their only chance of obtaining suitable materials was from off the watered roads and streets, and there they meet with constant interruption, and lose the supply of a Sunday. The martin has not the faculty of moistening the sun-baked earth or clay.

Great Northern Diver.—April 8. Last seen on this coast.

Redstart.—April 19. First seen.

Whitethroat.—April 19. Seen to-day in the garden.

Hedgesparrow.—April 19. This species has commenced breeding.

Cuckoo: the Egg Question.—April 25. Cuckoo first heard. Though not wishing to discuss the new but somewhat vexed question, as to the cuckoo's power over the egg, in diversifying the colour at will,

I may remark, if the theory prove true, that it is somewhat strange that neither the African cuckoo nor the American cow-bird have been endowed with the like faculty. That the cow-bird does not possess it the following extract from Wilson's work clearly shows:—"I had, in numerous instances, found in the nests of three or four particular species of birds, one egg much larger and differently marked from those beside it: I had remarked that these odd-looking eggs were all of the same colour, and marked nearly in the same manner, in whatever nest they lay, though frequently the eggs beside them were of quite a different tint." Are we, then, to suppose that the birds of America are less sharp-sighted than those of Europe or Africa? Buffon might have said so. With regard to the African cuckoo, I am informed by Mr. Rogers, of Freshwater, whom I have questioned on the subject, that he is quite certain, from personal observation, that its eggs are unlike those of the species in whose nests it lays. That the cuckoo's eggs vary in colour is well known; so do those of many other species, the common house sparrow, blackbird, &c. As to the reference made to the white-streaked rods set before the flocks by the patriarch Jacob, was it not a special and miraculous interposition of Providence? Why, then, the comparison?

Redthroated Diver and Gannet.—The redthroated diver was seen off Shanklin towards the end of September: weather stormy but mild; thermometer 60°. The gannet appeared on our coast about the same time.

Crossbill.—October 5. Several seen about the village and in the neighbourhood of Shanklin, where there are extensive fir and larch plantations; and a small flock made its appearance here later in the month. They must have visited the island in considerable numbers, as I heard of many being offered for sale to the birdstuffers, but mostly so disfigured and mutilated by large shot as to be useless. It is sad to see so beautiful and confiding a bird thus needlessly slaughtered. It is difficult to account for these irregular migratory flights: want of food cannot well be the cause, as it is obtainable at all seasons, neither can it be for nidification.

Rook.—Owing to the exceeding mildness of the winter rooks are returning to their nesting-trees. On the 20th of December I observed numbers collected about the old nests in the lofty elms near Bonchurch, in their usual state of excitement when about to rebuild or repair nests.

Thrush.—The thrush has been in song through the winter up to

this time; and, in consequence of the warm Christmas, has escaped the usual slaughter carried on at this season.

Raven.—Two young ravens belonging to Sergeant Rossiter, of Sandown,—taken from the Culver Cliffs, where a pair or two usually breed,—were visited during the summer by five old ones. A novel and interesting sight, too, that of seven such shy and wary birds congregating about a house in a town. The tame ravens, I hear, are as resplendent in plumage as the wild ones.

In June I saw at Mr. Smith's, the Newport taxidermist, a hobby (which had been recently shot in the island), a specimen of the hen harrier, a beautifully pied jackdaw of the season, and a brood of four white or pied hedgesparrows, taken from the nest. I was shown a green woodpecker, shot the previous September in the forest by one of the Parkhurst officials: it is the third green woodpecker, in the flesh, that has come into Smith's hands within a few years, so there can be no doubt, after the instances recorded, of their occasionally appearing in the island.

On visiting the Freshwater Cliffs, in June, the herring gull only was observed, and that by no means numerously; but I was told that a few pairs of the lesser blackbacked gull still nest there, as does also the peregrine falcon. I saw at Mr. Rogers's a remarkably fine hoopoe, in perfect plumage, shot in the neighbourhood; also a bittern, little auk, skua and little sandpiper; and was informed by him that he had lately seen, when walking on the Downs, three choughs flying about the cliffs, being the first he had observed at Freshwater during a residence of many years.

HENRY HADEIELD.

Ventnor, Isle of Wight,
January 4, 1869.

On the Occurrence of the Whitethroated Sparrow (Zonotrichia albicollis) *in Aberdeenshire.* By W. C. ANGUS, Esq.*

I HAVE much pleasure in adding this interesting North American species to the fauna of Europe. The bird which I send for exhibition, along with this notice, was shot by Mr. Mitchell, August 17th, 1867, near the Broad Hill, on the Links of Aberdeen. It was put into my

* Read before the Natural History Society of Glasgow, March 31st, 1868.

hands immediately after being procured, and I made a careful examination of the specimen before it was skinned.

The following description and measurements of the bird were then taken:—Length, six inches and a half; length of tail, about three inches; wing, from carpus, nearly three inches; wings, when closed, reaching to the extremity of the tail-coverts; irides hazel. Bill robust: mandibles compressed at the tips, the upper, which is longest, being hooked at the tip and darker in colour. From the nostril to the back of the head there is a distinct line, which is of a rich yellow in front of the eye and a dull white behind it. Feathers on the crown of the head reddish brown at the base, and rich brownish black at the tips, divided by a medial whitish line; feathers on the shoulders rich bay at the base and tipped with reddish brown, those on the back having brighter tints and a longitudinal spot of black on the tips. Rump olive-brown; chin white; breast dusky; under parts dirty white; feathers on the sides somewhat darker along their shafts. Quills dusky; outer webs margined with white. First quill short; third, fourth and fifth, about equal, and longest in the wing. First and sixth about equal in length; second, third, fourth and fifth quills abruptly cut away on the outer webs. Secondaries emarginate, edged with ferruginous on the outer webs. A double bar on the wings is formed by the white tips of the greater and lesser wing-coverts, the line on the smaller coverts being more conspicuous; the first feather being yellow, like the lower surface of the wing shoulder. Tail dusky, straight, consisting of twelve feathers, the outer webs being broad at the base, while the inner webs are broad at the points. Tarsus seven-eighths of an inch long; legs and toes robust; claws convex and sharp.

Sex, female. The stomach contained grass, sand, seeds and insects.

Variation.—On comparing the specimen described above with a male from New Brunswick, forwarded to me by the Society's secretary, and with other specimens obligingly lent to me by Professor Nicol of Marischal College, I find a slight difference in the bills—the sinus of the upper mandible being more or less distinct. The colours of the male in the New Brunswick specimen are not nearly so bright as those of the specimens belonging to the College Museum here,* the latter being, moreover, distinguished by having the whole throat mapped off

* These specimens were presented to the Museum by Audubon, and are labelled in the handwriting of the late Professor Macgillivray.

by distinct straight lines. The tail-feathers in all the specimens are more or less worn, the central feathers, which are wiry to the base, having, in some instances, merely the shafts remaining.

According to Wilson, this is the largest and handsomest of the American sparrows, and is common from Connecticut to Savannah, particularly in the neighbourhood of the Roanoke river, and in the rice plantations. In summer they retire inland and further north to breed. They remain in flocks during winter, preferring the borders of swampy thickets, creeks, and mill-ponds, skirted with alder-bushes and rank weeds, the seeds of which form their principal food. Early in spring they have a few remarkably sweet and clear notes, which they utter a little after sunrise. "About the 20th of April," adds Wilson, "they disappear, and we see no more of them till the beginning or second week of October."

Pennant gives Pennsylvania, New York, and Newfoundland as its habitat.

I am much indebted to Mr. Mitchell for kindly presenting me with this specimen, which has now been added to my collection. From its general resemblance to some of the female buntings, the bird might have, in less enthusiastic hands, altogether escaped observation. When shot it was perched on the top of a whin bush, and attracted Mr. Mitchell's attention by its note, and the manner of flirting its tail. I have only to add that the bird bore no traces of having been in confinement, the wings, tail and all the lower plumage being quite clean. W. C. ANGUS.

Irish Insect-hunting Grounds. By EDWIN BIRCHALL, Esq.

THE BOG OF ALLEN.

ACROSS the centre of Ireland, brown and bare and desolate, covering nearly half a million of acres, and extending eighty miles from east to west, and as much from north to south, lies this huge "Dismal Swamp." It may give some idea of the flatness of the great plain upon which the Bog of Allen is situated, and through which the Shannon rolls its sluggish flood, to say that a light upon Killiney Hill, near Dublin, can be seen from the Nephin Mountains in Mayo, one hundred and fifty miles distant, and the Bog probably owes its origin to the imperfect drainage consequent upon the configuration of the country. Attractions for the wandering tourist the district has none. Even the naturalist, to whom the picturesque is a secondary consideration, wisely

avoids its dreary solitudes, and it can only be called an insect-hunting ground on the "lucus a non lucendo" principle.

Philipstown and Tullamore, the two largest towns of the King's County, are situated on what may be called oases in the midst of the Bog, and the author of an old rhyme seems to have thought them as dismal as the surrounding Bog, when he wrote—

> "Great Bog of Allen swallow down
> That odious heap called Philipstown;
> And if thy maw can swallow more,
> Pray take and welcome Tullamore."

I have more than once made excursions into the Bog from these cities of refuge, but with scant success, as far as Entomology is concerned. Chortobius Typhon, Saturnia Carpini, Bombyx Rubi, Aspilates strigillaria and Schrankia turfosalis were my usual captures, and mostly abundant: the only rarities I ever met with were Dasycampa rubiginea and Xylina petrificata; these were on ivy at Tullamore — one specimen of the former, and the latter in profusion. Nature has been so liberal in her gift of peat bogs to Ireland, that Irishmen may be pardoned for believing, as many of them do, that they will one day prove a source of untold wealth, and many and costly have been the attempts, ending in loss, to convert into coal, oil or candles these vast accumulations of fuel; but the old-fashioned peat-cutter is still mostly in possession, and plies his spade the summer through, piling up immense stacks of turf all along the course of the canal which traverses the Bog: his cabin is usually a sort of pit under a dry bank, the roof a few branches placed across and covered with heath or turf, through which the smoke makes its way, and is the only sign of the vicinity of a human habitation, than which surely nothing more miserable can be found on the surface of the planet. Happily for these poor bogtrotters, their health does not suffer, as is the case with persons living on the margins of morasses where vegetables are decaying: a swamp abounding in rank vegetation emits noxious vapours at the season when the decay of the plants takes place, but a peat bog is of a different nature, being highly antiseptic, so that animals and vegetables remain for ages unchanged in its depths. This being the case it has surprised me to find the remains of but few insects embedded in the peat: I have only been able to obtain a few elytra of beetles of the genus Donacia, apparently those of still-existing species.

On one of my incursions into the Bog of Allen, near its southern extremity, I visited the ruins of Monaincha. In former times it appears what is now bog was a lake, in which were two islands, and even a century ago they are said not to have been accessible except in boats, the present drainage being choked by fallen trees: the old islands are a little raised above the level of the surrounding bog, and on them are the very ancient monastic ruins. Little of their structure can now be made out; but as the account given by Cambrensis, who visited them in the reign of King John, about A. D. 1185, is curious, and may be new to many of the readers of the 'Zoologist,' I venture to transcribe it:—"In North Munster is a lake containing two isles; in the greater is a church of the ancient religion, and in the lesser a chapel, wherein a few monks called Culdees devoutly serve God. In the greater isle no woman or any animal of the feminine gender ever enters but it immediately dies. This has been proved by many experiments. In the lesser isle no one can die; hence it is called Insula Viventum: often people are afflicted with diseases in it, and are almost in the agonies of death; when all hopes of life are at an end, and the sick man would rather quit the world than lead longer a life of misery, they are put into a little boat and wafted over to the larger isle, where as soon as they land they expire." I cannot say whether ladies ever venture to visit these interesting ruins; perhaps the drainage of the lake has broken the charm, but I will not guarantee their safety.

Amongst the Irish state papers there is a record relative to Monaincha, which exhibits a curious and melancholy picture of the state of Ireland in the early part of Queen Elizabeth's reign. Commissioners (two of whom rejoiced in the elegant cognomens of Dermoyd O'Towgha and Dermoyd Oge O'Dolgen) who were appointed to inquire as to "all land and all and singular other things for the Queen," report that the Monastery of the Virgin Mary in the island, of the living with all its profits, belongs to the Queen, and valued the land of the Priory in arable and pasture, comprising 533 acres, at £4 2*s.* 2*d.* The O'Mores and the O'Connors, and the rest of the O's of the period, are described as perpetually in array against the English Government; the country about Monaincha was alternately wasted by the English and Irish forces; the labour of the plough ceased, and the miserable peasants deserted their cabins and withdrew to the mountains and bogs to prolong a wretched existence.

Dr. Ledwich's 'Antiquities of Ireland,' published in 1803, contains a curious paragraph relative to the great extinct deer (*Megaceros*

hibernicus), the bones of which are so frequently disinterred from the bogs: he says that he "once imagined that these deer, whose remains we behold with wonder, were common, and that the Firbolgs,—a northern tribe said to have invaded Ireland three hundred years before our era,—who delighted in hunting, had early destroyed them." This opinion, he goes on to say, he relinquishes, "because the teeth of elephants have also been found in this island, an animal which we are sure was not a native; and the President of the Royal Irish Academy, Richard Kirwan, LL.D., F.R.S. (Trans. R. I. Acad., vol. vi., p. 233), whose mineralogical, chemical and philosophical knowledge is admired in every part of Europe, and whose talent and accomplishments reflect the highest honour on his native country, having by solid reasoning, from Scripture and Geology, demonstrated that this appearance of the southern animals was in consequence of the Deluge." We may smile at the learned President's solid reasoning, but perhaps another generation will write Ichabod on some of our own choicest speculations: viewed, however, in the light which modern research has thrown upon the subject, Dr. Ledwich would have done better to have stuck to his Firbolgs. EDWIN BIRCHALL.

Airedale Cliff, Newlay, Leeds,
December 20, 1868.

NOTICES OF NEW BOOKS.

'*The Mysteries of the Ocean.*' Translated, Edited and Enlarged from the French of ARTHUR MANGIN, by the Translator of 'The Birds.' London: T. Nelson and Sons, Paternoster Row.

THANKS, gentle translator of 'The Birds,' whoever thou mayst be, for this beautiful and welcome present. Well hast thou written that, "in order to adapt it to the wants of an English reader, and to make it more complete as a survey of the life and history of the ocean," thou hast made "numerous interpolations and additions, amounting probably to a fifth of the whole;" and again thou hast "also been careful to bring down the information to the latest date, and to exhibit the results of the most recent scientific research." I desire to state most explicitly that the subject is one of the greatest interest, one on which there has long existed a gap in our literature, notwithstanding the unwearying efforts of my friend Mr. Gosse. Then, as regards the getting up; the printing, paper and binding are superb: the wood-cuts

are of rare excellence; and I very sincerely congratulate the publishers on having produced a book which, even in these days of book-luxury, is more than commonly attractive.

I am quite unacquainted with the original work of which this is the translation, but the author or translator—for, like the Siamese twins, they are not safely separable—seems to entertain some novel views. In one instance, however, the translator gives French and English side by side: this occurs in a learned dissertation, at p. 224, on the structure of the wing of the pterodactyle, in which we find that "it has been named 'pterodactylus' because the fifth toe of its anterior limbs was enormously prolonged, and evidently intended to support a membrane forming a wing as powerful as that of the great tomtits." I admit that my Zoology entirely failed me in any attempt to understand this recondite passage until I found, by the translator's kind assistance, that the word translated "tomtits" stood in the original "roussettes," by which Cuvier designated those frugivorous bats, some of which are a constant source of attraction at the Zoological Gardens. This doubtless is one of "the results of the most recent scientific research" on which the author seems to plume himself.

Such changes of name are of constant occurrence. At p. 323 the *saw*-fish (*Squalus pristis* or *Pristis antiquorum*) is called the "common sword-fish (*Xiphias gladius*):" at page 326, the red fire-fish (*Pterois volitans*) is called "the flying-fish (*Exocœtus volitans*):" at page 333, the purple-finned sailor-fish (*Histiophorus immaculatus*) is called "the flying-fish of the Indies," and on the same page the name "sword-fish" is restored to Xiphias gladius; so that it is evident that our learned authors consider the *sword*-fish and *saw*-fish identical, the slight difference in the structure of beak and tail not being held sufficient to distinguish them as varieties. In like manner, at p. 382, the puffin (*Fratercula arctica*), the great auk (*Alca impennis*), and the razorbill (*Alca torda*) are reduced to a single species, which the author names "the penguin (*Spheniscus aptenodytes*);" and here another great feature in the work is worthy of attentive observation; in uniting these species so dissimilar we have the strongest evidence yet adduced in favour of that metamorphotic doctrine usually called Darwinianism. But to proceed, at p. 384 we have an excellent figure of the king penguin (*Aptenodytes Pennantii*), called "the great auk (*Alca impennis*)," but I am rather puzzled to find, on the following page (385), the same bird called the "booby gannet." I have adopted both names, and in my English Cuvier, have altered the king penguin thus—"Great

Auk or Booby Gannet." The "gorfou," at p. 386, is an admirable representation of the bird we used to call the "crested penguin." "The lesser black-backed gull (*Larus fuscus*)," p. 393, is a most accurate representation of the bird I have known from my childhood as the common cormorant. "The Storm Petrel or Mother Carey's Chicken (*Thalassidroma pelagica*)," at p. 397, is represented as a large and exquisitely spotted bird altogether different from the black swallow-like bird to which I have been accustomed to give that familiar name.

The three changers of received names, Swainson, Neville Wood and Macgillivray, are fairly distanced in this competitive nomenclature. All the three naturalists I have mentioned tried to convey a meaning in their new names, however neatly concealed; but in this translation of Mangin all is travestied: as in our pantomimes everybody is turned into somebody else.

I have said I never saw the original of this work, and therefore it is very difficult to make out which of these metamorphoses is due to the wand of the author and which to that of the translator; or whether both are harlequins: and it is equally difficult to make out when they are in earnest and when they are poking their fun at us. It is scarcely more easy to understand the birth of ocean. The authors, writing of "the Brute Period in which as yet no sign of life has appeared," evidently a kind of *lucus a non lucendo* period, proceed thus:—"The first rains fall. At the outset they are almost immediately evaporated upon coming in contact with the burning soil; but it cools all the more quickly: thus they are condensed to fall again and again, until liquid layers (so to speak) form and develop, augment in depth, and increase in extent, finally spreading over a considerable area, or even the entirety, of the earth's surface. Thus is born the Ocean."—p. 17.

This graphic description is rendered still more complete by a spirited engraving of "The primæval Ocean," with a chain of wild geese flying above its surface: one can't help thinking they must have felt thankful for so vast a supply of what they were henceforward to consider as their natural element: but this is one of the "mysteries" the volume leaves unexplained.

I recollect that the late Mr. Swainson, whose labours were once criticized rather severely by one who unfortunately acknowledged his inability to understand them, retorted that he had "written for generations yet unborn, not for such small minds as now intruded themselves into the walks of science." This is the case with the authors before

me; they write for more advanced naturalists than myself—"for generations yet unborn." There can, however, be no doubt that the fairest way to treat authors is that which I have always adopted, of allowing them to speak for themselves; and for this purpose I have selected a few passages which most nearly approach my own ideas of the intelligible in Natural History; and these I place in the hands of my readers without note or comment. Should they contain instruction my readers are most welcome to it. Should they contain passages that deserve reprehension I will not be instrumental in inviting attention to them.

Crustaceans.—"When we consider the almost invincible power which the Crustaceans derive from their armour, their muscular vigour, their ferocity, and their numbers, we ask how it is that they have not depopulated the shores, where they meet none but victims, no enemies capable of contending with them upon equal terms? For formidable as they are, and all the tribes of Mollusks and Zoophytes, what have they to fear? except in a few countries, certain littoral or amphibious animals, which, for the most part, only attack them as a last resort, preferring prey more easily devoured, and assisting them in their work of extermination rather than fighting them. The great fishes, the cetaceans, whose teeth of iron easily crush their armour, and upon whom their pincers vainly seek to lay hold, inhabit the deep seas. The carnivorous mollusks, with their long arms perforated with air-holes, their hard and crooked beaks, dare not assault them. Their tyranny, then, seems at first sight absolute, and without counterbalance; and we are tempted to believe that for the advantage of these invulnerable depredators the grand law of equilibrium and compensation has been neglected. Such, however, is not the case. Not only does man wage war everywhere against the strongest, whose flesh is always the firmest and most savoury, a war in which their nippers, their spears, their saws and their cuirasses avail them nothing; but the crustaceans also undergo at certain epochs a fatal crisis, which, delivering them up defenceless to external shocks and the blows of their enemies, places an easy vengeance within the reach of the oppressed. These epochs are their sloughing-times, when, willy nilly, with great difficulty, and at the cost of the most painful, and sometimes the deadliest efforts, they are forced to shed their armour of proof, to expose their living flesh barely covered with a thin soft pellicle, and to bury themselves piteously under the sand until the calcareous secretion shall be reformed and solidified anew. This is their season of fear and flight;

it is the hour of reprisal. Their hiding-places are easily discoverable, and once unearthed the disarmed brigands are lost beyond redemption. Myriads perish in this manner, devoured by other animals, crushed among the stones, or dashed in pieces against the rocks by the movement of the waves. The sloughing or shedding operation is more or less frequent, according to the species, the rapidity of increase, and their age. It takes place but once a-year with the decapoda; but it is of more frequent occurrence among the inferior kinds, whose increase is swift, whose life is short, and which in two or three days repair the loss of their cuirasses."—p. 256.

Sword-fish.—"The sword-fish (*Xiphias*) is placed by Cuvier in the Scomberidæ, or mackerel family. Its length sometimes exceeds twenty feet, and its beak measures one-third of its length. It is one of the swiftest denizens of the deep, and endowed with prodigious vigour. Hence it has not unfrequently happened that a sword-fish has struck a ship and driven its blade right through the scantling. The ancient naturalists, and many modern writers, affirm that with the aid of this terrible weapon it attacks the whale, and engages in desperate combats, when the victory is not always to the strongest. But it suffers in its turn from a small crustacean animal, which penetrates into its flesh, and sometimes tortures it so keenly that it will dash ashore with a violence fatal to its own life."—p. 322.

Thalassites.—"In my chapter upon the inhabitants of the primæval ocean, I have brought the reader acquainted with those gigantic and terrible animals—half fish, half crocodile—which committed such terrible ravages in its waters. The revolutions of the surface of the globe have annihilated these monsters, and the class of reptiles is simply represented to-day, in the marine world, by a few species, of great size, it is true, but of inoffensive habits, which feed only upon the sea-weed, or at most upon the small mollusks or zoophytes. All these species belong to a single family—the Chelonidæ, turtles, or marine tortoises. They receive the name of Thalassites (Greek *Thalassa*, the sea), to distinguish them from the land-tortoises (*Testudinata*, *Chersites*), the marsh tortoises (*Emydæ*) and the river tortoises (*Potamites*). They are the largest of all the Chelonidæ. They differ chiefly from their terrestrial congeners in the conformation of their feet, which, like those of all animals destined to spend their lives in the ocean tracts, are changed into paddle-like fins, and so flattened that the toes cannot execute, one over the other, any voluntary movement. The anterior pair are much longer than the hind feet, and can be used as oars,

enabling the animal to move through the water in any direction and comparative swiftness. The entire structure of the Thalassites is skilfully adapted to their essentially aquatic mode of existence. Their respiration alone is aërial, like that of the terrestrial reptiles, and for this reason they may claim to be ranked among the *guests* of the ocean. Their shell is much depressed, and presents the form of a shield enlarged in front, with a gash or indentation, and terminating in a point at the other extremity: it is so disposed that the animal can entirely conceal beneath it his head and feet. The head, nearly square, is armed with a kind of horny beak, very strong, curved and hooked down. The jaws are strong; the tongue is broad, short, fleshy and very moveable; along with the beak it is the only prehensile organ of these reptiles. The neck is long, the tail short, round and tolerably thick."—p. 369.

EDWARD NEWMAN.

Elephant Preserving.—We understand that the Madras Government have decided, with regard to the destruction of elephants, that on all waste and forest land the property of government, of zemindars, or others, the destruction of the female elephant should be prohibited under a penalty of from ten to five hundred rupees fine, and imprisonment not exceeding one month in default of payment. The destruction of the male elephant should be prohibited on all waste or forest lands, the property of government, under the same penalty, except by persons holding a license to shoot the male elephant from the collector of the district. Zemindars and other proprietors would retain the right to shoot the male elephant on their waste lands without the license of government. The right to shoot elephants trespassing on cultivated lands and on the high roads would remain as at present common to all. Persons shooting on waste lands and others would be exonerated from the penalties attached to the destruction of an elephant, when it could be proved that the act was committed in self-defence. The same exoneration would be extended to those who should destroy on waste land an elephant found on cultivated land, and pursued from thence. In addition to these legal provisions it will be desirable to offer rewards to persons belonging to the forest department, and others, who may give such information of the illicit destruction of elephants as may lead to the conviction of the offenders; that a stipulated price should also be paid for every elephant caught or trapped on private lands, and brought in alive and uninjured to any officer of revenue, police, or commissariat department; and that rewards for the destruction of elephants will no longer be given except in cases where it may be necessary for the protection of life or property to offer specific rewards for elephants known to be dangerous or notoriously infesting and destroying cultivation.—*Madras Times.*

Otters in Suffolk.—During the last week in November, 1868, a large otter was trapped in the Rev. William's park at Glenring, near Wickham Market, Suffolk; and on the 10th of December a dog otter was shot, as it was in the act of taking refuge in

the upper branches of a pollard oak, by a keeper, near Langholme Bridge, which crosses the Alde, a few miles from this place. Several otters have been seen in the reed-beds by the banks of the same river; and on several occasions since October I have found remains of pike upon the ground near various small streams in this neighbourhood.—*Alexander Clark-Kennedy; Wickham Market, Suffolk, December* 18, 1868.

White Fox in North Wales.—A purely white specimen of the common fox is reported to have been seen upon several occasions, during the month of December, in the woods a few miles from this house, but the hounds have not dropped upon it yet. Several persons have seen this remarkable animal, and there is no reason to doubt their statements. As I am writing of variations of colour in animals, I may as well mention that the gamekeeper told me a few days back that he saw an albino squirrel shot in a covert near Erddig last winter.—*Id.; Erddig Park, Wrexham, Denbigh, January* 3, 1869.

Pied Hare in Saffolk.—Early in November last the Duke of Hamilton, while out shooting near Easton Park, killed a hare which was prettily marked with white and iron-gray. The head, ears and part of the neck were white, mingled with gray, and the legs, feet and part of the chest were of a milk-white hue, as was a portion of the back, altogether giving the animal a curious appearance.—*Id.*

Barbastelle Bat at Salisbury.—I am not aware that the barbastelle (*Barbastellus Daubentonii*, of Bell) has been previously captured in our county; but, even if it has, the occurrence of so rare a British bat, especially at this time of the year, may not be without interest to some of the readers of the 'Zoologist.' The specimen alluded to is that of a very fine adult male, which, on the 1st instant, was noticed flying about the fields in the immediate vicinity of our city in broad daylight. A person who was passing knocked it down with his walking-stick, and took it to Mr. Best, a birdstuffer, living in Milford-street. Mr. Best told me the bat was very active (its right wing was broken by the blow from the stick, but it had apparently received no other injury), and, crippled as it was, managed to climb up and down its captor's arm. The almost total absence of frost, and general mild climate of the present season doubtless interfered with the hybernation of this little barbastelle; hunger induced it to venture out and endeavour to procure a few gnats when it met with its untimely death. The capture at this time of the year is the more remarkable as the barbastelle is a bat known to inhabit the south of France.—*H. P. Blackmore; Salisbury, Wilts, January* 1869.

Whitetailed Eagle in Suffolk.—Lord Henniker sent me on the 26th inst. a specimen of the above bird, which was caught in a trap baited with rabbit for gray crows, on the 20th inst., on the north side of the Home Wood, Thornham. It was a fine bird, in immature plumage, and consequently without the white tail. It measured across the wings, from tip to tip, 7¾ feet, and, although the plumage was a good deal injured by rolling in the mud, Mr. Ambrose, of this town—to whose skilful hands it has been consigned—hopes to turn out a tolerably fair skin. Another eagle, probably of the same species, was frequently seen about ten days ago at Alresford, near this place; but, being shot at and missed, it flew away. I wrote to Col. Hawkins for information as to dates, and he writes me word that it was last seen about the 16th or 17th, which would make it probable that the captured bird was the same. An eagle

in these days is a rare bird in Suffolk or Essex, and it is a fatal change of habit for the erne when it takes to hunting rabbits instead of fishing in the sea. Thornham and Alresford are about forty miles apart, "as the eagle flies."—*C. R. Bree; Colchester, December* 29, 1868.—*From the 'Field.'*

Osprey at Epworth.—A beautiful specimen of the osprey was brought to me, on Saturday, December 5, 1868, for preservation; it had been shot the day before on our marsh, near the Trent: it was assailed by a number of crows, and fell a victim to another enemy whilst combating courageously with its foes. It is a fine old male in adult plumage. This is the second specimen I have had during the last five years; the first was shot on the banks of the River Trent, in the act of devouring a large fish. —*J. F. Gravil, jun.; Epworth, January* 6, 1869.

Peregrine Falcon at Epworth.—The peregrines have again made their appearance on our marsh; they generally do so in January, and stay with us about a month—that is, when they are fortunate enough to escape the gamekeeper's traps and guns, to which, I am sorry to say, a great number of them fall victims. The large quantity of water-fowl to be found on our low and marsh-lands accounts for these noble birds being found here. In the latter part of January, 1868, a pair of peregrines in the flesh were brought to me by the gamekeepers, who told me they had trapped them in consequence of their having made such havoc among the ducks, &c.—*Id.*

Peregrine Falcon in Sussex.—A fine male was shot near Rottingdean early in the morning of the 9th of November, by Mr. G. R. Guthrie, making the fifth obtained by that gentleman: on the evening of the same day, at dusk, a female was shot by Mr. Bates, who shot a merlin the same day: the former gentleman shot a longtailed duck on the 11th and a green sandpiper on the 13th.—*T. W. Wonfor; Hon. Sec. Brighton and Sussex Nat. Hist. Society.*

Merlin near Epworth.—Two of these beautiful birds, the smallest of our British falcons, which were recently brought to me, in the flesh, proved on dissection to be adult males. The merlin is a very scarce bird in this part of Lincolnshire.—*J. F. Gravil.*

The Sparrowhawk.—An instance of the boldness of the sparrowhawk when in pursuit of its prey, occurred at my house about four o'clock yesterday. A crash of broken glass was heard in the kitchen, and on a servant going to ascertain the cause, the hawk was found fluttering in the window, and was secured without resistance. It had dashed in through one of the panes, making a round hole five or six inches in diameter. A cage containing a canary was standing on a table close to the window, and this had evidently tempted the hawk. When first caught it seemed rather stunned, but soon recovered, and was able to fly away, apparently no worse for the adventure. I take this opportunity to mention that my observations regarding the nidification of this bird, lead me to differ in opinion from many people, who allege that it *seldom builds its own nest.* Several have come under my notice during the last few years, and in each case the nest has certainly been newly built by the hawk itself.—*James Murton; Silverdale, West Lancaster, January* 16, 1869.

Common Buzzard at Boughton, near Faversham.—A specimen of the common buzzard was shot at Boughton about the 28th of December.—*A. Skinner; West Street, Faversham, January* 18, 1868.

Roughlegged Buzzard near Faversham.—A specimen of this bird was taken, by a keeper, in the summer, from a trap baited with a partridge.—*Id.*

Hen Harrier at Epworth.—A specimen of the hen harrier, a very rare bird in this neighbourhood, was recently shot on our marsh-lands by one of the gamekeepers, and was brought to me for preservation: on dissection it proved to be an adult male.—*J. F. Gravil.*

Great Gray Shrike at Henley-on-Thames.—I had a fine specimen of the great gray shrike brought to me to name, last Thursday, the 21st: it was shot at Cross-Lands near here: there were two of them; the other one was seen on the day following.—*Charles E. Stubbs; Henley-on-Thames, January* 25, 1869.

Blackthroated Thrush near Lewes.—On Wednesday, 23rd of December, a fine example of the blackthroated thrush was shot near Lewes. The bird, which proved on dissection to be a male, was in excellent condition, and, having been carefully handled, was in fine order for preservation; and in this respect has received ample justice from the hands of Mr. Swaysland, of Brighton, where it may be seen. This *rara avis* is well described by Bree, in his "Birds of Europe," and on comparison with the engraving, vol. i., page 187, was easily distinguished. It is, I believe, the first specimen taken in Great Britain.—*T. J. Monk; Mountfield House, Lewes, December* 29, 1848.—*From the 'Field.'*

Robin sitting in December.—It may be interesting to some of your readers to know that a robin is sitting on four eggs in a hedge close by the rectory garden in this parish.—*A. H. Monckton Russell; Laverton Rectory, Bath, December* 21, 1868.—*Id.*

Dartford Warbler near Truro.—The Dartford warbler has been reported as having occurred in some parts of West Cornwall, but I have not succeeded in recording an example ever since I commenced collecting, which is nearly forty years ago, until to-day, when Mr. Vingoe shewed me a specimen which he had received from Killiow, the seat of the Rev. John Daubuz, who shot it near his residence.—*Edward Hearle Rodd; Penzance, January* 11, 1869.

Dartford Warbler: Notes from Jersey.—I have but little ornithological news for you. The most remarkable thing I have seen were two Dartford warblers on the 16th of this month near Grève de Lecq, in Jersey: I was much surprised to see them at this season, and the more so as I find the bird is not included in the list given in Ansted's 'Channel Islands.' Spring in Jersey had already commenced when I was there a week ago, and I am told it is quite a common thing to see young birds (of the thrush and blackbird) as early as the end of February. The last two or three days have been more like winter weather, and on Friday a good many woodcocks were killed near St. Sampson's. In the birdstuffer's shop here I saw a little gull, in the flesh, which had been shot a few days ago; also a young great northern diver, of which there have been a good many killed this season: they have now, however, mostly left. In Jersey one day a gentleman brought in a redlegged partridge he had shot out of a covey of twelve. They are now a rare bird in the Channel Islands, having been nearly all shot down. Mr. Green, the landlord of the "British Hotel," St. Heliers, has a very perfect and carefully-preserved collection of the birds killed in the island, which he kindly showed me. But there are comparatively few people in the Channel Islands who are interested in this branch of Natural History. Floriculture seems the favourite, and the gardens, which are even now beautiful, must be resplendent in summer. The island of Herm is exceedingly rich in shells and in rabbits. Serk is famous for its rock scenery and huge aquariums in the form of caves in the rock with pools left by the tide: these two islands, however, I have not yet seen, except at a distance, so must stop

short in my descriptions until I have done so.—*John A. H. Brown; St. Peter Port, Guernsey, January* 25, 1869.

Dwarf Meadow Pipit.—A very minute specimen, in perfect plumage, was obtained on November 9th, near Cliftonville, and was taken to Swaysland: from its size and general appearance, thinking it a new species, he sent it to Mr. Slater, who pronounced it a dwarf. It measures five inches and one-eighth from beak to tail.—*T. W. Wonfor.*

Richard's Pipit near Barnstaple.—I shot a beautiful specimen of this fine species yesterday on Braunton Marsh, within a quarter of a mile of the spot where I killed one about three years ago. It is a young male of the year, and evidently a late bird as the gape is very large, soft and yellow. I was attracted to it by its loud and peculiar note. Yarrell gives six inches and three quarters as the whole length of the male bird: mine must be an extra large one, as it measures a trifle over seven inches and a quarter.—*Gervase F. Mathew; Barnstaple, January* 5, 1869.

Young Chaffinches in Nestling Plumage.—Mr. Clogg says, in his remarks upon the chaffinch published in the last number of the 'Zoologist' (S. S. 1514), that the young birds retain their nestling feathers till the spring moult, and that many of those seen in the winter in the plumage of the female are in reality young males: this statement is certainly incorrect. The chaffinch, like all the other finches, moults in the autumn, and the whole of the feathers of the young birds are shed, with the exception of the quill-feathers of the wings and tail, which are not changed till the autumn of the following year. The young males assume the plumage characteristic of the sex, but the colours are not quite so bright as those of older birds. The only change that takes place in the spring is the shedding of the brown margins of the feathers of the head and the back of the neck, after which process the colours appear brighter: there is no vernal moult. Sparrows shed the whole of their nestling feathers the first autumn, in this respect differing from the true finches, and indeed from most of the other British birds.—*Henry Doubleday; Epping, January* 1, 1869.

Hawfinches near Faversham.—In June I observed several hawfinches feeding on some cherry-trees in this neighbourhood: they were very shy, and could scarcely be approached within gun-shot. I succeeded in bringing down one, a fine male. A man living near the spot shot five at various times afterwards, two of which were young ones.—*A. Skinner.*

Variety of the Brown Linnet at Brighton.—A speckled variety of the above, with white tail and three white feathers in each wing, was taken near the Race-course on the 20th of November, and sold to Swaysland, of Queen's Road.—*T. W. Wonfor.*

Crossbills in Sussex.—Pratt the naturalist informs me two specimens, a male and female, were shot early in November, at Hurstpierpoint.—*Id.*

Crossbills near Faversham.—About the end of May I saw a quantity of these birds on some lofty fir-trees: I and a friend shot about twenty of various colours; the greater part of them were males. Some were in the beautiful red plumage. After a few days, these birds became very shy: I have had several brought to me since that time: the last I received—four birds, three of which were males—was on the 12th of January.—*A. Skinner.*

Variety of the Rook.—As I was walking round Chilham Park one day in the summer I perceived something black on the road, which proved to be a dead rook with a white throat besides the ordinary black plumage. This bird seemed to have been dead a day or two.—*Id.*

Great Black Woodpecker in Hants, unauthenticated.—The information sent to Mr. Gould as to the black woodpecker having been shot in Hampshire proves on investigation to be based on a wilful, bare-faced falsehood, showing how necessary it is to ascertain the real truth of what at first sight may appear unworthy of a doubt. Mr. Gould promised to investigate the fact before he admitted the Picus martius into the British Avifauna, as our readers will observe in my note in the last number of the 'Zoologist' (S. S. 1516). His doing so resulted in the following letter being sent to him by his former correspondent conveying the notice of the capture:—"Dec. 26, 1868. Sir,—I regret writing to you about the black woodpecker as Mr. —— told me he bought it in London Market, but *being so fresh he said, out of a joke, he shot it at Binstead.* I will be more careful for the future," &c., &c.—*Edward Hearle Rodd; Penzance, January* 11, 1869.

Great Spotted Woodpecker near Faversham.—I received an adult male specimen of the great woodpecker, in the summer, shot a mile from Faversham. I received a female specimen on the 2nd of November, shot by a man in Faversham churchyard.—*A. Skinner.*

Lesser Spotted Woodpecker at Faversham.—On the 13th of January I received an adult female specimen of the lesser spotted woodpecker, shot by a man in Faversham churchyard.—*Id.*

Late Swallow.—During yesterday and to-day a swallow has been constantly flying round and about my house and garden, as though with the intention of staying here. It has lost the right fork of its tail, suggesting to my mind the idea that it may have been shot at by some enthusiastic naturalist on its passage hither. Here at least it shall be safe.—*Philip O. Papillon; Lexden Manor, Colchester, December* 23, 1868.—*From the 'Field.'*

Variety of the Common Pheasant.—I have received two curious male specimens of this pheasant from a game-dealer in Faversham: they have a general plumage of cream-colour, besides the ordinary black markings.—*A. Skinner.*

Spoonbill at Benacre.—A specimen of the spoonbill was shot during the present January, at Benacre, in Suffolk, and will shortly be added to the rich collection of the Earl of Malmesbury.—*W. Hart and Son; West End, Christchurch.*

Bittern near Epworth.—I have just had a fine specimen of the bittern brought to me for preservation: it was shot on our marsh land near Epworth. Two or three have been shot in our neighbourhood during the last three or four years. About thirty years since this magnificent species was very abundant here, but the improved drainage has caused their visits to be few and far between. The bittern, in fact, I am sorry to say, is fast disappearing from amongst us.—*J. T. Gravil, jun.*

Bittern at Looe.—A bittern was seen in this neighbourhood last week.—*Stephen Clogg; East Looe, December* 26, 1868.

Avocet at Portsmouth.—During the present month of January a specimen of the avocet has been shot at Portsmouth, and is in the possession of Major Breton.—*W. Hart and Son; West End, Christchurch.*

Correction of an error: Parasite of Sabine's Snipe.—I have committed a signal mistake in stating the parasites of Sabine's and the common snipe to be distinct (Zool. S. S. 1511). They are precisely the same—an additional argument that Sabine's snipe is only a dark variety of the common species. It is a curious circumstance that out of about sixty parasites of various species examined by Mr. Cordeaux,

many belonging to closely allied species, those of Sabine's and the common snipe are the only two identical.—*J. H. Gurney, jun.; Darlington Bank, Darlington.*

Pintailed Duck near Faversham.—A beautiful specimen of this rare bird was shot about five miles from Faversham, on the 15th of January: it came alone from the sea to some "saltings."—*A. Skinner.*

Nyroca Duck in Leadenhall Market.—On the 14th of January my father got a Nyroca in Leadenhall.—*J. H. Gurney, jun.*

The Longtailed Duck.—Mr. Stevenson notes the longtailed duck as rather abundant in his district (Zool. S. S. 1495). Of five that I have seen in the flesh this season only one has been a mature male, and it was shot near Alnwick.—*Id.*

Longtailed Duck near Lynn.—On the 17th of January I had a longtailed drake, in the flesh, from King's Lynn.—*Id.*

Summer Duck at Boultibrook.—Last month (November) a small flock of the summer duck (*Dendronessa Sponsa*, Linn.), of North America, settled on a small pond in my grounds: they did not appear wild, and remained until the following day, when, at a very early hour in the morning, my gardener (Mr. Weatherstone) saw them perched on some large oak trees, at the end of the pond. I have made inquiries to ascertain, if possible, where these ducks came from, but hitherto without result. There are some large ponds in this neighbourhood, where I think they may have been seen. There were seven specimens in the flock. I never allow any bird to be molested here, and the ducks took flight the next day.—*Harford J. Jones Brydges; Boultibrook, December* 29, 1868.

Summer Duck at Lymington.—Early in November last I purchased a bird I considered uncommon, which had been shot amongst other wild-fowl on the shores of the Solent. I could not discover what the bird was, until last week I found it answered to the description of the summer duck given in the 'Penny Cyclopædia' (vol. ix. p. 184). Will you kindly give me your opinion, in the 'Zoologist,' as to where it came from?—*John Wright; Lymington, December* 26, 1868.

[Several have been killed lately: it is generally supposed they have escaped from confinement.—*E. Newman.*]

Goosander near Bedale.—On the 27th of January I had a magnificent old male goosander, in its full maroon-coloured plumage, in the flesh, from Semmer Water, near Bedale.—*J. H. Gurney, jun.*

Sclavonian Grebe near Faversham.—Two of these birds were shot three miles from Faversham, on the 13th of December: one of these I received on the 14th, it was an adult male, in winter plumage. I was informed by the man who shot them that there were several of them together. The stomach contained sea-weeds.—*A. Skinner.*

Little Gull at Brighton.—Several little gulls have been shot at or near Brighton. One was shot on the Race-course by a lad after small birds, who thought it was a pigeon: this with another shot between Brighton and Shoreham are in the possession of Pratt, and two others shot near Shoreham are in the hands of Swaysland.—*T. W. Wonfor.*

Little Gull at Looe.—A little gull was shot here on the 17th of December: on that day, as I was walking through the street, I met a boy with the bird in his hand; he told me he was taking it to the birdstuffer, so I was satisfied that it was in the right road for preservation; but on going to have a further look at it, three or four hours after, I was surprised to find that the so-called birdstuffer had refused it because it was only a

small gull, not worth stuffing. I immediately called at the boy's home, when I was told I should have it when the boy came in, he being from home when I called: in about an hour it was brought to me with both wings cut off close to the body, with an opening in the breast, and in a very dirty state, but by dint of much washing and sewing on the wings I have made a tolerable specimen of it. The person who shot it tells me there were a dozen or more flying about the mouth of the harbour at the same time, but, as he is altogether ignorant of Ornithology, I cannot vouch for the fact, but I do not think he would intentionally misinform me: he says he thought they were sea-swallows.—*Stephen Clogg.*

Kittiwake Gull in Faversham Creek.—On the 10th of November I received a good male specimen of the kittiwake gull, which was shot by a man in the creek.—*A. Skinner.*

Iceland Gull in Kingstown Harbour, County Dublin.—December 11, 1868. I have recorded the occurrence of an Iceland gull in this harbour on the 10th, but must record another to-day, noticed whilst walking on the West Pier: it is an older and much whiter bird than that last recorded. "It is a very rare species in Ireland; but two have occurred there" (Morris's 'British Birds'). Perhaps thirty have occurred to myself off the coast of Dublin in the last six years.—*H. Blake-Knox.*

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

January 4, 1869.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Transactions of the Linnean Society,' Vol. xxvi., Part 2; 'Journal of the Linnean Society,' Zoology, No. 44: presented by the Society. 'Proceedings of the Royal Society,' No. 104; by the Society. 'Memoires de la Société de Physique et d'Histoire Naturelle de Genève,' Vol. xix., Part 2; by the Society. Hewitson's 'Exotic Butterflies,' Part 69; by W. W. Saunders, Esq. 'The Entomologist's Annual,' for 1869; by the Editor. Newman's 'British Moths,' No. 25; by the Author. 'The Zoologist,' for January; by the Editor. 'The Entomologist's Monthly Magazine,' for January; by the Editors.

By purchase:—Gemminger and Von Harold, 'Catalogus Coleopterorum,' Vol. ii.

Election of Members.

W. F. Kirby, Esq., Assistant in the Museum of the Royal Dublin Society (previously an Annual Subscriber), and E. Holdsworth, Esq., of Shanghai, were elected Members.

Exhibitions, &c.

Mr. Bond exhibited two diminutive specimens of Vanessa Urticæ, about half the usual size of the butterfly; they were two out of fifty or more dwarfs, not all of the same brood of larvæ, which, owing probably to the extreme heat of 1868, had been

developed with remarkable rapidity, having remained less than a week in the chrysalis state.

Mr. Bond also exhibited a dark variety of the female Apatura Iris, and a very pale variety of Hesperia Comma.

Mr. E. G. Meek exhibited specimens of Dianthœcia Barrettii, captured by Mr. Gregson, in Ireland.

Mr. W. C. Boyd exhibited a specimen of Crambus myellus, captured by Mr. Adam Boyd some time since near Blair Athol, and which had remained mixed in Mr. Boyd's collection with C. pinetellus, until his attention was called to it by the announcement at the previous Meeting.

The Secretary exhibited photographs of nests of Vespa Britannica and V. arborea, presented to the Society by Mr. John Hogg, by whom the nests were found at Norton, Durham.

Mr. F. Smith exhibited a series of drawings of bees and wasps and their respective nests, and a number of the actual nests, collected in India by Mr. Charles Horne.

Mr. Horne (who was present as a visitor) gave some interesting details on the habits of the insects. The species of bee which was kept by the natives was, he believed, the Apis dorsata. In the North-west Provinces, it was necessary to leave the key in every lock, or the cavity was pretty sure to be occupied by a Pelopæus: if a sheet of paper was left on a mantel-shelf, it would be fixed thereto by an inserted mud-cell; or a like cell might often be found interposed between a pillow and the bed; even a little hollow in the floor, in spite of the inevitable destruction of the nest, would be filled; and in one case he had known a nest to be placed on the edge of a door, and it was seven times crushed by the shutting of the door, and seven times renewed before the little bee could be induced to forsake the spot she had chosen. Some of the nests exhibited were placed in very singular positions; one, of a leaf-cutting bee, was in the handle or ear of a terra cotta vase, access being obtained through a small hole in the narrow lower end of the handle; another, belonging to a Pelopæus, and consisting of a single mud-cell, was attached to a man's signet or finger-ring the stone of which had fallen out, and was fastened to the metal by means of a coil or knot of mud passed through the hole where the stone had been; a third nest of a bee consisted of a spherical mass of cells which was found in the centre (filling up the whole hollow) of the nest of a mouse, which was suspended in grass.

Prof. Westwood mentioned that at Oxford he had found a mouse's nest in the centre of one of his bee-hives, surrounded by a number of headless bees.

Mr. Horne also exhibited a strong earthern cocoon, dug out of the ground, and containing a large species of Sternocera: he had frequently found the perfect beetle thus encased, and it was the regular habit of this species of Buprestidæ. (Compare the habit of Lucanus cervus, lately reported.)

Prof. Westwood exhibited drawings and gave some account of various remarkable insects, including (1) a species of Leptocorisa (Cimicidæ, Coreidæ) sent by Mr. Thwaites, from Ceylon, where it was very injurious to the rice crop, sucking the juices of the plant—it was probably identical with the local variety of Cimex varicornis which he (Prof. Westwood) had described under the name Bengalensis; (2) an Ichneumon and an Epeira, the larva of the former being an external parasite on the body of the spider; other instances of external parasitic larvæ were, Eulophus (Chalcididæ) on a willow-gall saw-fly, and larvæ of a Scolia on larvæ of the Lamellicorn beetle, Oryctes;

(3) a new species of Coleoptera from the Niger, referable to the genus Aprostoma of Guérin, with which it was suggested that both Mecedanum of Erichson and Gempylodes of Pascoe might probably be united; (4) a beautiful species of Lamiidæ, from the Zambesi; (5) a second species of the genus Ectrephes of Pascoe (Proc. Ent. Soc. 1866, p. xvi); and (6) a new genus in Count Mniszech's collection, allied to Rhyssodes, and intended to be described as Rhyssodina.

Mr. A. E. Eaton communicated the following note:—

"Dr. A. S. Packard, jun., has very kindly sent me a *separate* of a paper by him, On the Structure of the Ovipositor and Homologous parts in the Male Insect, from the Proc. Boston Soc. Nat. Hist. vol. xi. (Feb. 26, 1868), in which he has corrected his earlier observations. The result of his later investigations is to confirm M. Lacaze-Duthier's statement that 'les tarières des Névroptères sont semblables aux tarières des Hyménoptères," which his earlier conclusions had (as I showed in Trans. Ent. Soc. 1868, p. 143) contradicted; and the paper also shows in what way the French author came to be mistaken in supposing that the sting grew out from the ninth segment alone."

Mr. Frederick Smith read the following:—

On the Affinities of the Genus Sibyllina, of Westwood.

"At the Meeting of this Society on the 16th of November, Professor Westwood described, under the name Sibyllina ænigmatica, an insect that has for some years been standing nameless in various collections. I had, myself, after a somewhat cursory examination, referred it to the ants, and had placed it in the family Poneridæ. A few years ago I had an opportunity of submitting this insect to Dr. Nylander, who thought I was right in so doing, but I must admit he had only time to give it a very slight examination. Prof. Westwood (Tr. Ent. Soc. 1868, p. 329, Proc. p. xli.) has referred it to the Vespidæ, its position being indicated as near the genus Belonogaster, of Saussure.

"At the time when the paper was read, I expressed an opinion that it could not belong to the Vespidæ: I have therefore felt bound to examine the insect with a greater degree of attention, and have carefully and minutely investigated its structural peculiarities: the result has been, that I have changed my opinion as to the family to which it belongs, although I shall still be found to differ widely in that respect from Prof. Westwood, and also from Mr. Haliday, who once examined the insect, and determined that it belonged to the Sphegidæ, being in his opinion closely allied to the genus Pelopæus.

"Having expressed an opinion that it does not belong to the Vespidæ, it is incumbent upon me to give my reasons. In the first place, all true wasps, the social as well as the solitary species, have the anterior wings folded longitudinally, except when they are used in flight; in the genus Sibyllina they are not folded. In the next place, every true wasp has four submarginal cells, the fourth being very frequently incomplete, but in some species of the genera Belonogaster, Polistes, and also of the genus Vespa, among the social wasps, and in the solitary group, in the genera Zuthus, Rhynchium, Abispa and Synagris, the fourth cell is complete; but I know no species of wasp that has not three complete submarginal cells; the genus Sibyllina has only two. Then, every true wasp has three discoidal cells in the anterior wings; Sibyllina

has only one. The prothorax in all the Vespidæ forms the upper anterior portion, and is prolonged backwards to the tegulæ of the wings; the prolongations also forming lateral portions of the upper surface: this is not the case in the genus Sibyllina. The only character which Sibyllina possesses in common with the Vespidæ is that of having lunate, or notched, eyes: this I regard as only a subsidiary character, being common to a vast number of Hymenopterous insects. We find the lunate eye in many species of the genera Mutilla, Scolia, Sapyga, Pemphredon and Philanthus: then again, among the Ichneumonidæ, it is found in species belonging to the genera Pimpla, Camploplex, Anomalon, Ophion and some others; this character therefore cannot be regarded as any strong evidence in favour of Sibyllina being a genus of Vespidæ. It is a fundamental character, distinguishing the social wasps, that the claws of the tarsi are all simple—in Sibyllina the claws of the posterior tarsi are toothed;—the solitary wasps are distinguished by having the claws of the tarsi dentate.

"After a very careful examination of the insect, I have come to the conclusion that Sibyllina belongs to the Ichneumonidæ.

"The first, and the strongest objection that can be urged against this opinion, will doubtless be that the antennæ are only twelve-jointed, and not, as in the generality of the Ichneumonidæ, multiarticulate: this is undoubtedly true, but there are genera of Ichneumonidæ having only twelve- and thirteen-jointed antennæ. Among the minute Ichneumons the genus Trioxys is found to have thirteen-jointed antennæ; and in Ephidrus, belonging to the same group, they are only twelve-jointed. In the next place, I believe every species of the larger group of Ichneumons, (I am not prepared to speak of the minute ones in that particular) has double-jointed trochanters: these joints in most of the genera and species are distinctly visible, but not universally so in the group; in some species belonging to the genus Exetastes, the second joint is retracted within the first, and is only partly visible; the same is the case in the genus Anomalon. I have carefully examined the structure of the legs of Sibyllina, and I find a second joint distinctly visible, quite as much so as in the Ichneumonideous genus Metopius. The antennæ of every wasp that I have seen are geniculate, in Sibyllina they are not. In addition to this, the prothorax is of the same structure as in Ophion and Anomalon; its ocelli are large and prominent, as in those genera, whilst in the Vespidæ they are much smaller, and usually more sunken than prominent. Another most remarkable peculiarity in the structure of Sibyllina, is the broadly-dilated tarsal joints, a character I believe nowhere to be found in the Vespidæ, but peculiarly characteristic of the species of the genus Anomalon. The abdomen of Sibyllina has the basal segment narrowed into a slender petiole; this is also characteristic of the genus Ophion and Anomalon. Then again, Sibyllina is furnished with a sting, or ovipositor; its structure is precisely the same as the sting or ovipositor of Ophion and Anomalon: in fact I can discover no external difference between the stings of Belonogaster, Vespa, Ophion and Anomalon; in each the sting tapers to a sharp point, and is simply a hollow tube, having a groove beneath, that in the wasp being, I presume, for the purpose of conveying poison into the wound made by piercing, and in the case of the Ichneumons for conveying the egg into the victim attacked.

"Place Sibyllina in any group of the Hymenoptera, and it will, as it were, stand alone; it has little affinity that I can discover, certainly it has no strong affinity, with any other known insect. But having pointed out those parts of its structure that agree with the same parts in the genera Ophion and Anomalon, I shall conclude by

expressing my opinion that the genus Sibyllina should be referred to the Ichneumonidæ, and that its closest ally is the genus Anomalon."

Prof. Westwood thanked Mr. Smith for his careful investigation of the affinities of Sibyllina, and congratulated him upon having arrived at a conclusion identical with that of the American entomologist, Mr. Cresson, who had referred to the Ichneumons an insect which he (Prof. Westwood) believed to be the same as Sibyllina. At the same time he was scarcely prepared to admit that the insect is an Ichneumon. The two-jointed trochanters, upon which Mr. Smith placed considerable reliance, were by no means peculiar to the Ichneumons, and if the character existed in Sibyllina, it rather pointed in another direction; he (Prof. Westwood) however could not detect the second joint, though he had looked carefully for it. Mr. Smith had not noticed the diversity in the number of joints in the antennæ of the sexes, twelve in the male, thirteen in the female, which was very characteristic of the Aculeata.

The President suggested that Sibyllina might be the type of a group connecting the Vespidæ and Ichneumonidæ.

Papers read.

The following papers were read:—"On the Affinities of the Genus Sibyllina of Westwood," by Mr. F. Smith. (See above).

"Descriptions of Nine New Species of Buprestidæ," by Mr. Edward Saunders. Belonging to the genera Sternocera, Julodis, Catoxantha, Chrysaspis (n. g.), Psiloptera, Pseudhyperantha (n. g.), Hyperantha, and Acherusia (two).

Annual Meeting, January 25, 1869.—FREDERICK SMITH, Esq., Member of the Council, in the chair.

An Abstract of the Treasurer's Accounts for 1868 was read by Mr. S. J. Wilkinson, one of the Auditors, and showed a balance in favour of the Society of £78 16*s.* 0*d.*

The Secretary read the Report of the Council for 1868.

The following gentlemen were elected Members of the Council for 1869:—Messrs. H. W. Bates, Hon. Thomas De Grey, Dunning, Grut, M'Lachlan, Pascoe, Salvin, G. S. Saunders, F. Smith, Stainton, S. Stevens, A. R. Wallace and Wormald.

The following Officers for 1869 were afterwards elected:—President, Mr. H. W. Bates; Treasurer, Mr. S. Stevens; Secretaries, Messrs. Dunning and M'Lachlan; Librarian, Mr. E. W. Janson.

The President's Address (in the absence of Mr. Bates, whose official duties compelled his attendance elsewhere) was read by the Secretary.

A vote of thanks to the President for his services during the past year, with a request that the Address might be printed in the 'Proceedings,' was proposed by Mr. A. R. Wallace, seconded by Mr. Pascoe, and carried unanimously.

Thanks were also voted to the other Officers, and Members of the Council for 1868; and the votes were acknowledged by Mr. S. Stevens, Mr. Dunning and Mr. Janson.

Mr. M'Lachlan proposed, and Mr. W. C. Boyd seconded, a vote of thanks to the Pro-President for his conduct in the chair. This was also carried unanimously; and Mr. Frederick Smith made a suitable reply.—*J. W. D.*

Observations on the Metamorphosis of Siredon into Amblystoma.

By. O. C. MARSH.*

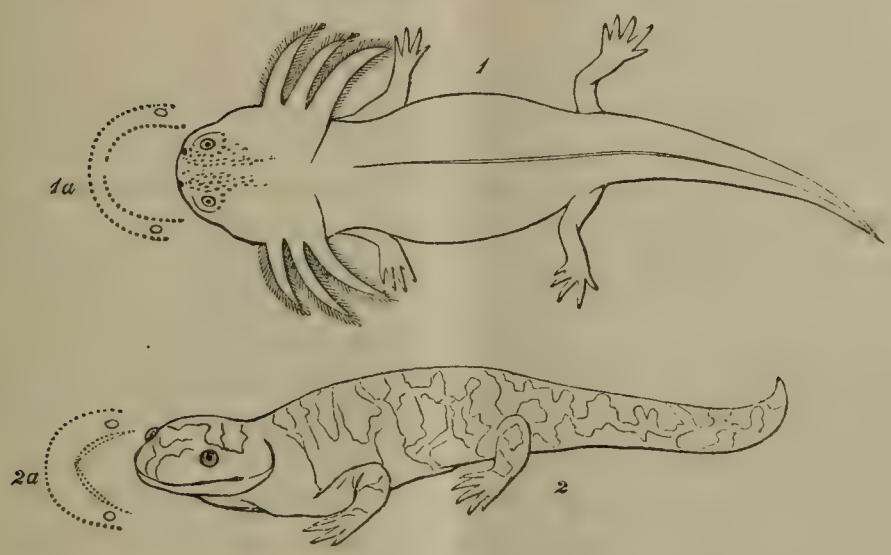

Fig. 1. Undeveloped larva of Amblystoma Mavortium of Baird, hitherto known as Siredon lichenoides of Baird (half natural size).

Fig. 1 *a*. View from below, showing the arrangement of the maxillary and palatine series of larval teeth and inner nostrils of the same.

Fig. 2. Amblystoma Mavortium developed from Siredon lichenoides: metamorphosis apparently completed (half natural size).

Fig. 2 *a*. Maxillary and palatine teeth of the same after metamorphosis.

WHILE on a geological excursion to the Rocky Mountains, during the past summer vacation, the writer obtained at Lake Como, in Wyoming Territory, a number of specimens of Siredon lichenoides, one of the most interesting forms of the Urodela, or tailed Batrachians, and one hitherto but little studied. This lake is a small shallow sheet of water, distinctly brackish, or "alkaline," apparently from the salts of soda. It lies near the Union Pacific Railroad, about 640 miles west of Omaha, and at an elevation of about 7000 feet above the sea. The surrounding region is an arid desert, with little or no vegetation, except cactus and wild sage.

The siredons obtained at this locality, where the species, known as the "fish with legs," is quite abundant, showed at first no differences,

* Reprinted from the 'American Journal of Science and Arts,' and communicated by the Author.

except those of age and sex. They were from five to ten inches in length, of a uniform dark olive, or pistachio-green colour above and a light olive below. The vascular fimbriæ of the external branchial appendages, or gills, were black. In form and general appearance all the specimens corresponded essentially with the one represented in fig. 1. They were brought to New Haven alive, apparently without suffering much inconvenience, either from a transfer to fresh water or from the long journey. They all fed readily upon worms and insects, and occasionally came to the surface and inhaled air. More rarely an exhalation occurred, usually under water. On being removed from their native element they soon showed the same signs of distress as fishes under similar circumstances, although in a much less degree.

The account recently published by Prof. Duméril of the remarkable metamorphosis of the second generation of axolotls (*Siredon Mexicanus*) from the table lands of Mexico, while kept in the Museum d'Histoire Naturelle, in Paris,* made it a point of no little interest to determine whether this species also would undergo a similar change when placed under different physical conditions, and hence the specimens were watched with considerable care.

The first indications of any change were observed in one of the smaller specimens, about six inches in length; and the metamorphosis had apparently commenced during the journey from Lake Como to New Haven, which lasted about a week. Small round spots of dark brown were first noticed on the sides of the tail, and the colour of the entire animal gradually assumed a darker hue. The broad thin membrane along the back, and above and below the tail, gradually began to diminish by absorption, the external branchial appendages soon became similarly affected, especially at the ends, and the animal came more frequently to the surface of the water for air. As the change went on the dark spots increased in number and size, and gradually extended over the whole upper part of the body. The membrane on the back and tail entirely disappeared, leaving in its place in the dorsal region a sharp groove. The branchiæ also continued to diminish, and at the same time the internal branchial arches began to be absorbed, and shortly after the openings on the neck closed up. In the meantime the head became more rounded above and more oval in outline, the muzzle narrower and more pointed, and the eyes more convex and prominent. The body also decreased in bulk, and the costal grooves

* 'Comptes Rendus,' tome lxi., p. 775, 1865; and tome lxv., p. 242, 1867.

became more distinct. The thin external skin was shed, and the secretion of mucus from the surface sensibly diminished. During these changes the animal showed an increasing desire to leave the water, often remaining for some time with its external nostrils above the surface, and occasionally making violent struggles to escape. Aided by a heavy rain at night it at last succeeded, and thus put an end to further observations, just at a time when it had lost the generic characters of Siredon and become a true Amblystoma, two forms of Batrachians usually regarded as belonging to distinct families.

Fortunately, a few days later, several other specimens of various sizes began, nearly at the same time, to show unmistakable indications of a similar transformation, and this afforded an opportunity of noting the successive phases of the change more fully, as well as of observing the physical conditions which seemed to promote or retard it. Two of the specimens were placed in a glass jar, and left in a strong light, and five others were kept in a cooler place in the shade, the temperature of the two, however, differing but a few degrees. At the end of three weeks those in the glass vessel had apparently completed their metamorphosis, while of the others less favourably situated three only were partially altered, and at the present time, or nearly three weeks later, they still retain tubercular remnants of the external branchiæ, although in most other respects the change appears to be complete. The two remaining specimens, however, which had throughout been kept with the three last, showed no distinct signs of changing, although the probability of their doing so, and the importance of retaining some tangible evidence of the original condition, led to the transfer of one of them to a jar of alcohol after the first week, a precaution, as the result showed, quite unnecessary in the case of the other, which at the time of writing (October 5th, 1868) still remains a typical siredon, with no alteration more important than a single appearance in a new epidermis.

The changes observed in the five specimens that underwent the complete metamorphosis were essentially the same as those noticed in the one already described, although in no two individuals were the successive phases quite contemporaneous or identical. The most marked differences observed were in the colour, both during the transformation and after its completion. This was very noticeable even in specimens exposed to the same physical conditions. In the siredon state all were apparently precisely alike in this respect, and the first indications of change detected in each case was the appearance of the

small dark spots along the sides of the tail. From this stage onward the variation in colour in different individuals became very marked. Of the two specimens exposed to a strong light in the glass vessel, one rapidly became covered with dark spots, especially on the back and sides, until finally these predominated, and the grayish yellow of the ground colour only remained in vertical and irregular patches, the rest being a greenish black. The companion of this specimen, however, although apparently equally advanced in development, retained for some time nearly the original siredon colour, the only difference being some irregular blotches on the sides, to which the specific name lichenoides would very appropiately apply. These were the extremes of colouring after the change, the other specimens showing various intermediate grades, one individual having dark brown spots on a light olive ground. All the altered specimens, it should be stated, apparently belonged to the species Amblystoma Mavortium, as recently defined by Prof. Cope, in his able Review of the Amblystomidæ;* and it is an interesting fact that among the six specimens that have already changed the present coloration appears to indicate two, if not three, of the forms which he there regards as varieties, although previously considered as species by other eminent authorities. In this place should perhaps be mentioned a remarkable change of colour which took place in one of the siredons before any indications of metamorphosis had been detected. The animal had been in the dark for several days, and was then placed in a white porcelain vessel, and kept for several hours in a strong light, while an attempt was made to photograph it. During this time it changed from the dark siredon colour to a very light yellow. The next morning the original colour had returned, but a second exposure produced the same change, which was as speedily reversed on returning the animal to the dark, although it evidently suffered considerably from the treatment. Even a moderately strong light appeared to be distasteful to all the siredons, and they usually sought the darkest part of the space in which they were confined.

The second distinct phase in the metamorphosis, which, however, commenced in every instance before the change in colour had made much progress, was the absorption of the dorsal and caudal membranes. This began on the lower margin of the tail, and soon after could be detected in the dorsal region, and then farther back, the last

* Proceedings Philadelphia Acad., xlx., p. 166, 1867.

portion remaining being usually on the upper part of the tail. The absorption extended below the dorsal surface, leaving at first a groove along the back, marking the position of the membrane; and as this disappeared the light-coloured specimens retained in its place a narrow black line, which extended also to the end of the tail.

The absorption of the external branchiæ was the next marked feature in the transformation, although this also commenced before the changes just mentioned were completed. The atrophy apparently began at the extremities of the branchial processes, and when these had diminished to about half their natural size, and the fimbriæ had disappeared, the ends rolled up underneath, leaving the remnants as rounded tubercles, which, in some of the specimens remained long after all the other stages of the transformation were passed. The absorption, moreover, did not always proceed with equal rapidity on the two sides of the same animal, but in one instance stumps of the processes were retained on one side some time after those on the other had disappeared. During the diminution of the external branchiæ, the internal vascular arches which support the external processes also became absorbed. As these disappeared the orifices on either side of the neck and the open fold of the throat became closed by the adhesion of the opercular flap to the surface below, leaving, especially in the gular region, a deep cicatrix. These changes, which were in each case apparently completed before the remnants of the external branchiæ had disappeared, were evidently the main cause of a marked alteration in the shape of the head, which occurred about the same time. In the siredon state the head is broadest at the base, and comparatively flat above, but after the loss of the branchial arches its greatest breadth was a little behind the eyes, while it was much more rounded above, and in outline more oval. The neck also diminished in size, and the snout became more pointed. The change in the eyes, already alluded to, likewise altered the appearance of the head materially. The flat, fish-like eye of the siredon projected very slightly above the surface of the head, but during the transformation this organ became more convex, and also much more prominent. This change in the eye was apparently indicated also in the habits of the animal. The siredons seldom missed their aim in catching a worm or insect, but when under water after the metamorphosis they often made several ineffectual attempts to seize objects quite near them.

One of the most interesting features of the transformation occurred in connection with the mouth of the animal. The opening, or gape, increased considerably in size, one half at least: the internal and external nostrils became perceptibly more distended, and the tongue, which was at first small, enlarged so as nearly to cover the entire floor of the mouth. An important change also took place in the teeth. In the siredon the palatine series on the vomerine and pterygoid bones formed an arch nearly concentric with the maxillary row, and extending forward between and beyond the inner nostrils. The arch is interrupted in front, and to some extent on the sides, as represented in figure 1 *a*, which shows the position of these teeth, but not their exact number or size. After the metamorphosis the palatine series project farther from the roof of the mouth, and become much more transverse, forming an obtuse angle instead of an arch, with the interspaces nearly or quite united. The maxillary series also form a somewhat narrower arch, corresponding to the more pointed snout of the Amblystoma, and the splenial teeth of the lower jaw have gradually disappeared. These changes in the dental series, it should be stated, were not in all cases perfectly uniform in different individuals that had apparently passed through the same external phases of transformation, although the tendency was all in the same direction; and hence it is not unlikely that the palatine teeth of some, at least, of the specimens examined, may eventually become still more transverse than those represented in the figure.

Among the other more important changes which occurred during the metamorphosis may be mentioned the decrease in the size of the entire body, which was very marked, a perceptible increase in the distinctness of the costal grooves corresponding to the vertebræ, and the gradual ossification of the carpus and tarsus. The feet also became less palmate, and the toes less depressed. During the transformation, moreover, and especially after its completion, all the specimens shed the thin, transparent epidermis, some of them very frequently; one, indeed, which had been kept in a strong light, lost this covering three times in the ten days immediately following the metamorphosis.

The change in the habits of the siredon in passing into the Amblystoma state was scarcely less marked than the alteration in its physical characters. As soon as the absorption of the external branchiæ commenced the animal came more frequently to the top of the water and took in a mouthful of air; and not long afterwards would occasionally

float for some time at an angle of about 45°, with the external nostrils above the surface. Frequent efforts to leave the water soon followed, and an opportunity of so doing was in most instances speedily improved, and the change then seemed to progress more rapidly. One or two specimens, however, showed for some time, especially in cool weather, much less inclination to desert their native element, apparently suffering little or no inconvenience from remaining under water, if allowed to come to the surface about once in five minutes. The pugnacious propensities of the siredons, which at first led to occasional assaults on one another, appeared to diminish as the change progressed, and the more sluggish nature of salamanders at last predominated; but the altered forms at times showed no little celerity of movement, and when irritated, especially when held by the tail, would often turn and snap at the hand with a rapidity that would have done no discredit to a reptile of much higher organization.

The effect on the metamorphosis of a variation in light and temperature has already been alluded to. During a succession of very warm days, about the 1st of September, the change progressed with great rapidity, but it apparently ceased, or made very slight progress, in the cool week that followed. While, moreover, the two specimens most favoured in regard to light and warmth passed apparently through the entire transformation in about twenty days, those which commenced at the same time, but were less favorably situated, required at least twice that time for its completion. The only living specimen still remaining unchanged has twice shown slight indications of an approaching metamorphosis, but with the exception of some spots, these have apparently soon disappeared after a transfer to a dark and cooler place.

Inasmuch as this species of Amblystoma appears to have never before been studied from living specimens, and especially as its larva (hitherto known as Siredon lichenoides) has but very rarely been met with, it may be well to mention some of the more important characters noticed in the individuals just described, in addition to those given in the original description of the two forms, when the connection between them was unknown. It should, perhaps, be first stated that, after the observations here recorded, it becomes at once evident, on examining Prof. Baird's excellent description and figures of Siredon lichenoides,* that the specimen on which the species was

* Stanbury's Exped. to the Great Salt Lake, p. 336, 1855.

founded cannot be regarded as a typical larva, as it had already made considerable progress in its metamorphosis. This appears to be distinctly shown in the colour-markings, which suggested the specific name, and likewise in the dorsal and caudal membranes, which have apparently been materially diminished by absorption. The evidence of partial transformation seems to be equally strong, also, in the case of the specimen from Nebraska, subsequently figured and described by Prof. Baird under the name Siredon melanosticta, which is possibly only a variety of S. lichenoides.* The coloration, the irregular outline of the membranes, the rounded extremities of the branchial processes, as well as the arrangement of the palatine teeth, all indicate that the animal figured had already entered upon the preliminary stages of metamorphosis. In each of these cases, however, it is not improbable that the alteration may have been temporarily, or possibly even permanently, suspended before the animal was captured. Aside from the features which may be the result of partial transformation, the siredons from Lake Como do not differ essentially from Prof. Baird's original figures of S. lichenoides, except in having a somewhat broader head, and in not having the dorsal membrane extend to the occiput, differences which may be due merely to locality, as the type specimen came from a point about four hundred miles farther south.

The siredons obtained at Lake Como, as already stated, were from five to ten inches in length. The colour of the body is a very dark olive above and a light olive below, while the fimbriæ of the external branchiæ are nearly or quite black. On either side of the body are twelve costal grooves, not including the inguinal. The skin is smooth and transparent, and shows beneath it the ends of innumerable glands, thickly crowded together. In specimens preserved in alcohol these glands project, making the surface appear granular. The dorsal membrane commences a short distance from the base of the head, and both this and the lower membrane extend a little beyond the end of the tail, thus making the extremity slightly emarginate. The carpus and tarsus are unossified. The digits are broad at the base, depressed and triangular. The fourth toe is longest, and has four phalanges. The head is broad and flat, and the muzzle rounded. The external nostrils are smaller, and slightly nearer together than the interior nasal openings. The eyes are round, and the iris of a yellowish metallic

* Pacific Railroad Report, vol. x., plate xliv., fig. 1; and vol. xii., part 2, p. 306.

lustre. A series of mucus-pores begins near the inner margin of each of the external nostrils, and diverging slightly extends over the nasal and frontal regions. Opposite the eyes they each connect with an orbital series. Another series, less distinct, exists on either side of the throat, just below the ramus of the lower jaw. Of the four branchial arches, only the three anterior support external processes, and the latter are thickly studded on their lower surfaces with lamellar fimbriæ. The maxillary and palatine series of teeth have already been mentioned. The former consists of a single row of slender pointed teeth on the premaxillary and maxillary bones. The palatine arch of teeth, situated on the vomerine and pterygoid bones, forms a narrow and more complex series. The teeth of the lower jaw consist of a single row on the premandibular bones, and an adjoining and somewhat more complex series on the splenial bone. The two close in between the maxillary and palatine arches when the mouth is shut.

The following measurements are taken from two of the Lake Como siredons. No. 1 is the individual figured at p. 1569, and No. 2 a specimen preserved a short time in alcohol.

MEASUREMENTS.

	No. 1.		No. 2.	
	Inches.	Lines.	Inches.	Lines.
Length from snout to end of tail - - -	7	9	8	
„ gular fold - - -	1	1	1	1
„ armpit - - -	1	8	1	9
„ groin - - -	3	9	3	10
„ behind anus - -	4	4	4	5
Width of head where greatest - - -	1	3	1	4
„ tongue - - - - -	-	-		8
Distance between eyes anteriorly - - -		7		7
„ outer nostrils - - -		5		5
„ inner „ - - -	-	-		6
Length of anterior branchial process -		8		7
„ posterior „ - -	1	2	1	2
Distance between outstretched toes - -	3	9	3	8
Height of tail, including membranes where greatest	1	3	1	3

Before the transformation was entirely completed, the generic characters of Amblystoma had become unmistakable; although in each instance—as not unfrequently occurs in nature—some of the characters which distinguish the species had already preceded them. Among the altered forms, developed from larvæ apparently identical,

the two types of coloration have each at present two representatives, and are sufficiently distinct to merit a more particular description. The former has a ground colour of greenish black, on which are bands or patches of grayish yellow, more or less confluent, especially along the back. The abdomen is dusky olive, with a darker medial band. The latter type clearly corresponds to Amblystoma maculatum, which is regarded by Prof. Cope as a variety of A. Mavortium. In this form the ground colour is light olive, on which are scattered numerous small brown spots. In each specimen a few of these first appeared on the tail, and next four of larger size on either shoulder, and subsequently others on the sides. The specimens of this type are also larger and more sluggish in habit than the other variety, and until very recently would have been considered distinct species by all herpetologists. In most other respects, however, there is little or no difference between the two forms, and both of them, with one other specimen representing an intermediate grade, must apparently all be regarded as belonging to Prof. Baird's species, Amblystoma Mavortium.*

At the time the siredons here described were obtained at Lake Como several others also were secured by Prof. Eustis, of Harvard College. All were brought to New York together, and there separated, part being taken to Cambridge, where they have since been carefully observed by Professors Wyman and Eustis, and the rest brought to New Haven by the writer. The former specimens, however, strange to say, have shown but very little inclination to change, none having commenced so doing until after several of the latter had fully developed into Amblystomata, and only the smallest, about five inches in length, having just completed its metamorphosis. This individual, as Prof. Wyman informs the writer, seems still to prefer remaining in the water, —doubtless owing in part to the cool autumnal weather,—although it is there exposed to attacks from the large siredons, one of which has twice attempted to swallow it—an interesting fact illustrating the habits of the species. Two of the siredons kept by Prof. Eustis escaped during a rain storm, and six days afterwards one of them was found still alive, although shrivelled up and the branchiæ partially gone. On being placed in water it refused food, and soon died. That siredons of apparently this species are occasionally found in wet grass near the water, especially after thunder showers, had already been

* Journal Acad. Nat. Sci. Philadelphia, 1849, p. 292.

noticed by Dr. Suckley,* but that they can remain out of water for several days is a new and important fact, showing that even before metamorphosis the lungs are sufficiently developed to sustain life without the aid of branchial or dermal respiration.

Whether this species of siredon ever changes at Lake Como, and in other similar regions, is an interesting question, and one that cannot, perhaps, at present, be answered with certainty. That it does so occasionally, however, under favorable circumstances, especially when young, several facts known to the writer would seem to indicate, although Dr. Suckley, one of the few observers who have hitherto examined it in its habitat, regards it as probably permanently aquatic.† In the elevated region where Lake Como is situated, although the weather in summer is quite warm, the nights are always cool, and the changes of temperature often sudden and very great; hence the metamorphosis, if it began, would probably proceed slowly, and be liable to suspensions during its various stages. That the species, however, breeds in the siredon state, like the Mexican axolotl, there can be little doubt, although direct evidence on this point appears to be wanting. The observations of Duméril, already alluded to, and other similar facts, render it probable that after reproduction the power of complete development would be lost, although alterations in colour and other minor changes might still occur.

The near approximation in many Batrachians of the periods of reproduction and metamorphosis, and the effects, especially upon the latter, of even slight differences of physical conditions, as shown in the preceding instances, are known to produce when combined remarkable variations in the same species, as well as other results until recently quite unexpected. The bearing of these and similar facts on a theory of development, although an inviting topic to enter upon, cannot, for various reasons, be discussed in this connection, but it is evident that in this direction lies a rich field for further investigation. The observations here recorded, however, when taken in connection with those of Duméril on the Mexican axolotl, render it extremely probable—as Cuvier long ago seems to have suspected‡—that all siredons are merely larval salamanders, and also suggests a doubt whether some, at least, of the other so-called Perennibranchiates (by no means a natural

* Pacific Railroad Report, vol. xii., part 2, p. 306.

† Loc. cit.

‡ Recherches anat. sur les Reptiles, &c., Paris, 1807, p. 35.

division of the Batrachia) may not prove eventually to be the undeveloped young of well-known species.

In addition to the acknowledgments already made, the writer desires, in concluding, to express his thanks to General W. Snyder, Superintendent of the Union Pacific Railroad, for his kind assistance in securing the siredons at Lake Como in August last; to his friend Prof. E. D. Cope, of Philadelphia, for various suggestions in regard to the subject here treated of; and likewise to his friend Prof. George F. Barker, of Yale College, for careful observations on the specimens while he was temporarily absent from New Haven.

O. C. MARSH.

Yale College, October 10, 1868.

'*Letters Home.*' By the Rev. HAMLET CLARK.

[When, in 1867, I published a brief notice of this interesting little book in the 'Zoologist' (S. S. 997) I was absolutely compelled, from want of space, to cut out and omit the extracts given below. I knew too well the interpretation truthfully given to such phrases as "want of space," "crowded out," "unavoidably postponed," "great press of matter," and so forth, to pen either of these "formulæ for the confession of editorial poverty," and so quietly laid by these extracts for the "more convenient season," which has now arrived. They lose none of their original freshness from having been deferred for fifteen months; and I am sure it will be a sincere pleasure to many of my readers to be thus agreeably reminded of one they loved so well as my friend Hamlet Clark.—*Edward Newman.*]

Fire Flies.—This is a pleasant boarding-house in the very midst of the wood, with virgin forest on all sides of us, and plenty of insects even in the rainy season. I have been out two or three evenings, hardly with the expectation of getting anything, but for the sake of seeing the fire flies. It is no figure of speech to say that on still evenings, especially after a rainy afternoon, they eclipse the stars; their lights are of all sizes and magnitudes, and more than one colour. The large Elateridæ of the genus Pyrophorus have a brilliant, steady and very bright light: these are difficult to catch, inasmuch as they sail slowly round the tops of the high trees, looking exactly like wandering planets; others, smaller but of brilliant lustre, fly hither and thither among the brushwood (also Pyrophori perhaps, at all events Elateridæ and not Lampyridæ, like our English glow-worm), quite within reach of one's net; only to rush after their lanterns in the dark would incur the risk of broken bones: all I can do is to admire.

There are other species also, more nearly represented by our English glow-worm, that haunt especially damp situations; on one side of the road leading to the house is a deep gully, conducting a little stream to a small lake of water: this road, on such evenings, presents a marvellous sight—the whole of the gully is lighted up with thousands of sparks. I am not romancing, they are in thousands; and the wonderful part of the sight is, that while many of these rank and file evidently wander only according to their individual will, there are others, and these the majority, which keep perfect time and sway in their flashings one with another! For perhaps twenty yards you see every light (of this *second* set of lights) evenly and slowly flying in one direction; then all at once in a moment every light will vanish; in the next moment every light flashes forth again, and progresses in another direction: it is impossible to resist the conviction that all are acting in harmony and conjunction with each other, and that the impulse of forward progression and then of a momentary obscuration of light, and then again of a brilliant simultaneous flash and another onward movement at another angle, is felt by each individual and directed by one, the leader of the brilliant well-drilled band. The sight (when one remembers that these are insects, and not birds or beasts) is quite startling, so complete is the precision of united action, and so continuous! going on, for anything I know, all the evening or all night long: I can call to mind no parallel to it, not even an actual parallel in birds or fishes!—p. 149.

Cetoniadæ and Lucanidæ.—My night excursions have supplied to me a fine series of two not uncommon but handsome and characteristic Brazilian species, one of the Cetoniadæ and one of the Lucanidæ. There is a little clump of dwarf bushes by the side of the rivulet, on which, by accident, I threw my bull's-eye light: I saw a couple of fine beetles, somewhat allied to our stag-beetle, which had just alighted on an outside twig, obviously with some distinct intention. I let them alone and watched them; they travelled quickly along the twig, down the branch, down the stem, till they got nearly to the ground, and then I discovered their object: the little stem was bleeding, giving forth gummy sap from some cracks in the bark; round this were collected three or four specimens of beetles and a few moths; the former I carefully secured; and by marking the bush and searching during daylight for others like it, and then examining each occasionally when the weather invited an evening stroll, I managed to get a fine series of examples.—p. 151.

Resinous Sap attractive to Insects.—I think I never mentioned to you one of the interesting sights that we always took care to inspect whenever we ascended the aqueduct road from Botofogo. There was near the roadside a large tree standing by itself in the sunshine; towards the top of it a branch had been torn off by the wind, and the wound gave forth a stream of dark resinous sap, which ran nearly down to the ground: this resinous sap was a very favourite haunt of Lepidoptera and Coleoptera, and indeed of all orders. The butterflies were the most showy visitors, of course; they were not the smaller weakly winged species that haunt the footpath, but magnificent fellows, with wings almost as strong as a bird's, that swept down from the heights above, and condescended to approach the earth only to visit some hospitable tree like this, which is keeping open house to all the insect world. Of the beetles, the most prominent were splendid fellows of the longicorn genera Trachyderes, Lissonotus, &c., very common, but very handsome; besides these were dangerous looking giants of Ichneumons and smaller Diptera, &c., without end: but, alas! though the visitors to the tree were so abundant, they were unavailable for us; the sap was unfortunately in the blazing sunshine, and this made every creature so alert (and withal many were so high up the trunk) that we soon found that to capture them was hopeless. But I always made a point of visiting the tree: by creeping up slowly and keeping as much in shade as possible I could watch the revellers without causing much alarm; the tree was manifestly a well-known luncheon-room for all insects whose morning duties led them into that part of the forest; they kept coming in from all quarters and going away in all directions; the big butterflies were fussy and unneighbourly, running up and down in the sunshine and disturbing all around them; the beetles, though lively enough on occasion, were more demure, and sedulously attended to the main object of their visit. I wonder what all those creatures think of each other; they do not gossip, like ants, but they make way for each other, and the manifestation of alarm by one is at once accepted by all in his neighbourhood. The Ichneumons are unpopular among the insect tribes; everybody gives one of them a wide berth, and interchange of civilities, as between butterflies, are of the curtest: one big black or steel-coloured gentleman is so obnoxious that as soon as he alights everyone in that neighbourhood departs. What a vast deal there is for us to learn! these creatures, I suppose, have their traditions, and if not traditions (by these I mean, of course, the natural tendencies that they derive from their parents), their own

personal experiences. *I* know they are right about those Ichneumons, perfectly right; but how do *they* know it? How do those little creatures know that the steel-coloured Ichneumon would as soon have a luncheon off them as off the gum, perhaps prefer them! or indeed that he in *his* experience of life visits this tree in the full expectation of being able to get a wholesome meal off one or two flies; or do they know it at all? and why, when they cannot endure the shadow of a carnivorous fly, will they permit without difficulty the blundering swing of the antennæ of a Trachyderes right across their bodies, or let a big Papilio almost walk over them? There is a degree of discrimination in all these actions that is quite superior to the instinct of, we will say, a Chlamys, which on the approach of danger makes itself in an instant exactly like a bit of caterpillar's dung! That is inexplicable enough, but that is simple and uniform; the rule of life among the Chlamidæ is, "if ever you are in the least frightened, roll yourself up as tightly as you can;" it is their misfortune or their good fortune that the result is that the sight of them would turn the stomach of any respectable bird on the hunt for food. To this rule there is no exception; a harmless butterfly accidentally touching them would metamorphose them into an unpleasant-looking cylinder just as soon as the touch of my very dangerous finger and thumb. But here on this gummy tree, the rendezvous of insects, you find something very superior to this; there is a discriminating power which is always exercised aright, and which seems very much like the result of memory and of experience: certainly the absence of any such discriminating power might be in a moment fatal, putting an end to all experiences: it is the quick-witted who live, it is the dullards who are food for Ichneumons; although whence they got their wits I can tell as little as I can tell why the old hen partridge makes her brood cower down in the stubble at the sight of a distant hawk, while she cares nothing at all for fifty crows or gulls; all that is evident is, that such knowledge is essential to preservation of life, and that such knowledge has been imparted to them by their Creator.—p. 152.

Notes on Bird Parasites. By JOHN CORDEAUX, Esq.

THE theory that every distinct species of bird has its own characteristic parasite, is probably a correct one. Comparatively little has yet been done in this branch of Entomology, and excepting the

magnificent work of Mr. Denny,* there is not, as far as I am aware, any treatise or work on the subject.

During the last year I have microscopically examined and taken drawings of the parasitic insects infesting about sixty species of birds, many of them now extremely rare in Great Britain: for these I am indebted in a great measure to Mr. J. H. Gurney, jun., who has very kindly, from time to time, forwarded specimens taken from various birds lately added to his valuable collection. Others, again, have been taken from birds shot by myself in this district. The observations recorded in this paper have been jotted down at various periods during the year in my note-book, and I now bring them together, trusting they will interest my readers. As I possess, however, but a slight knowledge of Entomology, I can make no attempt at a scientific description of these insects.

These minute creatures belong to the Louse family, the genus Pediculus of Linnæus. They are found, in greater or less numbers, concealed amongst the feathers of birds, whose blood they suck. Their life is intimately connected with that of the bird; they cling to it in summer and winter, in sunshine and storm, accompany it in all its many migrations and wanderings, are often carried to the bottom of the sea, and at last, when it dies, they lingeringly perish.

With two exceptions, the parasites belonging to the sixty species of birds examined are distinct. Some, indeed, are very closely allied and have a general resemblance, but when placed side by side on a glass slide and carefully compared they differ considerably. The exceptions are in the parasites of Sabine's snipe and that of the common species (Scolopax gallinago), and those of the rock dove and domestic pigeon: in both cases these insects appear identical, a careful examination failing to detect any difference.

There is one small insect, however, which I call a "tick," common to all birds alike. I have examined specimens taken from widely different species—skuas, redshank, gannet, glaucous gull, whimbrel, green plover, golden plover, &c. They are not always present, but may be occasionally detected: for instance, in ten golden plovers I could find only two; a single green plover afforded about a dozen. They are usually found concealed amongst the small feathers of the head and neck, differing in this respect from the true parasite, which may be found all over the body. These "ticks," although inhabiting

* 'Monographia Anoplurorum Britanniæ, or an Essay on the British Species of Parasitic Insects.' 1842.

so many widely different species, are identical—to sketch or describe them would be mere repetition. The head is triangular, broad at the base, with the apex somewhat prolonged, forming a sucking mouth; there are six short legs, three-jointed, and armed with acute single claws: these claws are moveable and close between two small projections, thus forming a very efficient forceps: they cling by this means to the barbules of the feather with great tenacity, and are extremely difficult to detach. Compared with the true parasite they are a slow, sluggish moving insect, and, placed on a smooth slide of glass, as helpless as the famed Italian knights who, overthown, lay immovable in their heavy armour, like lobsters. The true distinctive parasite is a very nimble fellow, running rapidly, even over a smooth surface: their feet seem to be used in quite a different manner to the "tick's"—in the one case formed for grasping, in the other for progression. The abdomen in the "tick," at its juncture with the short thorax, is as wide as the base of the head, but gradually increases in width for two-thirds of its length, and then rapidly contracts. The sides of the abdomen from thorax to extremity are encased with horny plates, overlapping at the angles of the body, but disconnected towards the centre: these plates are pierced along the lower edge with minute round holes for half their length: in the remainder of the plates, towards the centre of the creature's back, which is uncovered, the edges are only scalloped: it is difficult, however, to give a clear idea without drawings. The body and six legs are thinly covered with long hairs; there are two many-jointed feelers placed one on each side of the head, and just above them respectively a smaller process, the use of which I cannot determine. These creatures are remarkably tenacious of life: I have found them, after having been gummed to paper and passed through the post, quite lively. But the most remarkable instance of vitality was shown in one taken from a hooded crow: one evening I fastened this insect with a little gum to a glass slide, purposely leaving its head and thorax free, the better to see the construction of its legs: six days afterwards, on placing the slide under the microscope, I was astonished to find it as active as ever, and struggling to free itself from the gum. These "ticks" are uniformly of a bright brown or burnt-sienna colour.

With the exception of these "ticks," which appear common to all alike, I believe it will be found that every species of bird has its own distinct and characteristic insect. A batch of parasites taken from a bird and placed on the same slide, side by side, and examined

together, will occasionally show certain well-marked differences: when I first became aware of this fact I thought they might probably be referable to distinct species; but after examining every parasite I could detect on certain birds, have come to the conclusion that these differences are due to age and sex. I have no doubt that totally distinct parasites may be found on some birds, nor do I indeed well see how this can be otherwise, although I have not yet, except the "tick," detected more than *one kind of parasite on each species.* In the eagles, hawks, &c., preying on other birds, and in the crowded breeding colonies of sea-fowl, also in many other ways, an interchange of parasites might be effected. In handling or skinning a bird infested with these small creatures I have frequently found them running over my hands and fingers. Birds, again, of different species, packed together in the same box or hamper, might in this way alone produce two or three distinct forms.

The size of these minute insects is not by any means proportioned to the relative size of the particular species of bird they inhabit. We might naturally suppose the larger the bird the larger the parasite: the very reverse is often, however, the case. The parasite of the golden eagle is remarkably small and much below the average; that of the ring ouzel is very large, the head alone being equal in bulk to the entire parasite of the eagle. The parasite of the merganser is about equal in size to the golden eagle's, while that infesting the ice duck is fully ten times its bulk. The smallest I have yet examined is that of the little auk—one-third less than one taken from a bearded tit.

Closely-allied species of birds have very often very opposite parasites: those of the common and velvet scoter are totally distinct, and in no one point resemble each other. There is, on the other side, often a strong resemblance between these insects when the species they infest are widely distinct. The parasites of the peregrine falcon and reeve are strikingly alike.

Bird parasites may be divided into two classes, the long-headed and the broad-headed: there are many gradations between these two types. In the long-headed the head resembles the spade on a playing-card, but narrower; that of the broad-headed kind may be likened to that of a true British bull-dog, and has a most determined and ferocious expression: the mouth in these creatures is under the head, the flat eyes on the upper surface, and placed on each side in a slight cavity: these eyes are very conspicuous in the parasite of the green plover,

and in this species are of a blood-red colour: the abdomen is made up of segments, varying in different species from six to nine; the legs are three-jointed, terminated with a wrist (?), a pad and ten sharp crooked claws. The antennæ are placed on each side of the head; they are four-jointed, but vary in different species: these antennæ are often placed in a notch on each side of the head: this is particularly the case in the long-headed sort. The insects are usually, in a greater or less degree, covered with hair. In the parasite of the turnstone the abdomen is very thickly covered with hairs: those of the eagle and snowy owl are also very hirsute; others, again, as in the greenshank and little gull, are comparatively free from hair.

Parasites are far more commonly found on some species than on others: they are common on the birds of prey and also on some kinds of sea-fowl. The fulmar petrel is very subject to them. The Corvidæ also often swarm with these creatures: this is particularly the case with the hooded and carrion crows. They are few, and rarely found, in the golden plover, and more rarely on the snipe: I have frequently searched numbers of these birds without detecting a single insect. What part they play in the economy of the bird, and whether they effect it for weal or woe, it is difficult to determine. I find, as a rule, that where a bird is in an unhealthy state, very poor, or suffering from some old injury, that then they are most numerous. This is also the case with some mammals: the sheep fag is always most abundant when sheep are in poor condition, or have been shrinking, and when cattle shrink they often become lousy. I have seen birds so infested with these creatures that life must have been insupportable: they swarmed like ants in an ant-hill, and must undoubtedly have exercised a prejudicial effect on the life of the bird. Birds in the highest condition I have found invariably the freest from parasitic insects.

The eggs of parasites are usually attached to the feathers. In a fulmar petrel the eggs or egg-cases were very firmly attached to the shaft of the feather, some of the barbs being enclosed. Under the microscope this egg appears to be built up of small particles, like a martin's nest.

There is a great field for investigation in connection with these minute parasitic insects: I trust, therefore, that these few remarks may induce some of my readers to take up the subject and prosecute the inquiry. If it becomes an established fact that every species has its own characteristic parasite it would be interesting to know whether

a species having a wide geographical range and inhabiting opposite climates afforded the same parasite, or whether closely-allied species or varieties of a species exhibit any difference in the insects infesting them. For instance, it would be important to compare the parasite of the common jay with that of the blackheaded jay (*Garrulus melanocephalus*) or the Himalayan bird; that of the jackdaw with the black jackdaw (*Corvus monedula-nigra*); the coot of Europe with that of Southern India, and scores of other instances where birds are identical, varieties or closely-allied species. In making these comparisons it would be necessary, however, to examine every parasite that could be found not only on one bird, but many of the same species; otherwise the result might be unsatisfactory and end in nothing. I have strong hopes if this were done it might materially help to decide the claims of many doubtful birds to rank as distinct species.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
February 1, 1869.

Rough Notes from the Channel Islands.
By JOHN A. HARVIE BROWN, Esq.

JANUARY 26. On Saturday last, whilst driving over towards Cobo Bay, on the west side of the island of Guernsey, a fine large peregrine falcon flew close overhead. As the peregrine is a rare bird in the Channel Islands, I am inclined to believe that this bird must have followed the flight of woodcocks which I spoke of in my last letter (Zool. S. S. 1560). To-day I went over to the island of Herm, accompanied by my mother. * * * During a stay of about a week there, I managed to collect a good many species of shells, the proper names of which, however, I do not yet know. One large shell, of an ear-shape, is here called the "Ormer shell" (*query*, is "Ormer" a corruption of the French "Oreille"?), and is found at low-tide adhering in considerable numbers to the under sides of the loose granite boulders on the coast around Herm: the fish is excellent eating when carefully cooked, and is of much the same flavour, firmness and consistency—after being well hammered with a mallet—as a well-done veal-cutlet. Another species of shell is only procurable at extremely low tides, and in one little bay at the back of the island: I only obtained a few specimens, as the day was cold, and upon cold days the

fishermen tell me they are not so easily found: they are small bivalve shells, beautifully marked with purple and green, and having often two bright pink or dark purple spots on either side of the hinge: they are obtained, like most other living bivalves, by searching for the little round holes in the wet sand, which indicates their whereabouts, and by digging quickly beneath to the depth of a foot or more. But, as regards shells, perhaps the most wonderful peculiarity of Herm is the shell-beds at the north and north-east end of the island: here the tide often rises forty feet, and occasionally as high as forty-five feet: at low-tide great floors of rugged rocks are left uncovered, with bits of sandy shore showing here and there, and altogether presenting unveiled one of the most dangerous-looking coasts I ever saw anywhere: at one point especially do the shells seem to have been accumulated by the tides and current in immense numbers: cartloads are taken away at times to be burnt into lime: they are for the most part very minute, and many of them are very beautiful; so minute, indeed, are many of them that it is almost impossible to pick them up, except by means of a pair of forceps or the tip of a tea-spoon; and this also the more especially if the day be such a one as the first, on which I lay on the north-east bank, shivering and teeth-chattering, in a cold east wind. How many species I have collected I cannot say at present, as they are all carefully packed up in little boxes of cotton. Perhaps the two commonest and most delicate-looking species are little pink-tipped conical and minute pink spiral shells: the latter can be obtained in any numbers in one little bay at the back of Herm.

Whilst lying on the north-east bank one day I was startled by the loud noise made by a flock of oystercatchers on the rocks, and looking up observed a flock of these birds, of whose numbers I could form no conception: nowhere have I ever seen such immense numbers as I to-day beheld: they were crowding on to a particular point of rock to such an extent that a great many of them could not obtain standing room: at least I should think one-third of the whole were continually hovering and alighting again, quite unable to obtain a foothold without displacing their companions: a perpetual piping was all this time kept up by the birds, though at the distance, and from the number of the birds, it sounded in my ears merely as a loud and confused "hum": it is worthy of notice also that during the rest of my stay on the island, though the tides left the rocks in a very similar state, I never again observed anything like the number seen on that particular day, although the numbers of the other species seemed in no way diminished.

I watched through my glass a nice flock of forty curlews wading sometimes knee-deep and thrusting their long bills deep amongst the green slimy-looking sea-weeds. Also saw large flocks of ringed plovers, amongst which I could easily distinguish numerous individuals of the Kentish plover: these two species seem to feed together, but always to separate when on wing. I also observed a solitary knot far out on the shore, and a couple of herons fishing in the rock-pools at least four hundred yards from the main island: their heads only were visible, as they occasionally stretched their necks and peeped over an intervening sand-bank, but as the sun was shining right on them, as I swept the rocks with my glass,* I easily noticed them. A fine flock of Brent geese pitched in the water about three hundred yards from where I was seated: some winters these birds are very abundant round Herm. At the north-east point of Herm the tide runs past at a tremendous pace,† forming a stream about sixty yards wide between the main island and the outlying rocks. I was seated close to the edge of this torrent, when a pair of redthroated divers, all unaware of my presence, came floating swiftly past with the current, within ten yards of the shore: I had a quick but clear view of them for a minute or so, but they were soon swept past a projecting rock out of sight: another day, at the same spot, I had another opportunity of observing them in precisely the same manner. A few razorbills and one guillemot also drifted past me. All this time the oystercatchers on the far-out reef were piping and fluttering, and perhaps fighting for foothold; but now, as the tide rose, these clamorous birds began to disperse; little bands of six or eight splitting away from the main body and flying away westward along the shore. When the tide was nearly full the ringed plovers and the Kentish plovers—always keeping separate from one another—flew piping across the shell-bank, and whirled down again to the beach on the other side: had I had a gun, and been so inclined, I could have obtained abundance of specimens—indeed have made a valuable addition to our larder, which was in no ways over abundantly supplied.

January 28. To-day I walked round the island examining the coast scenery: this was well worth seeing, but rather tame and disappointing after such rock scenery as the West of Scotland presents.

* I cannot too strongly recommend Mr. Steward's "Lord Bury Telescope" to the ornithologist: it is a beautiful glass.

† I have heard it stated to be often at the rate of thirteen miles per hour, but whether correctly so stated I cannot take upon myself to say.

A little cave not half a mile south of the landing-place is well worth a visit, especially to the botanist who wishes to see that beautiful fern, Asplenium marinum, growing in perfection: the cave is only about twenty feet in length and three or four feet wide, but a person can easily walk in to the very back of the cave; right to the back, and covering the whole roof and sides, grows the Asplenium marinum, of good size and wonderful freshness. At the back or south-eastern side of the island is a fine creux, or funnel-shaped opening in the top of the cliff, communicating beneath with the sea, which dashes through a lateral opening at high tide; but fine as this creux is said to be, it is but a pigmy compared with the one of a similar nature at the back of Handa, in West Sutherland. Here, in Herm, the sides of the creux are some eighty feet high at the most, whereas those of the one at Handa, being quite as high as the outside and surrounding wall of cliff, must be at least three hundred feet, and I think I understate their altitude at that figure. Moreover, the walls of the creux here are not nearly perpendicular, and it would be no hard matter to descend from top to bottom or *vice versa*, but at Handa such would be simply impossible, unless a fifty-fathom rope were used, as the walls are quite perpendicular, and indeed in some places the top overhangs the base.

During my walk round the island I saw a fine covey of partridges and also two couple of birds already paired: these have been introduced to the island by the present proprietor, and he intends, I believe, also to try and stock his island with pheasants. I met the gamekeeper to-day busy amongst the rabbits: he told me that a large eagle had for some time been flying about Herm, but some two days back had taken a strychnined bait which he had laid for it, and had not since been seen: he felt sure it was lying dead somewhere; and accordingly on the following Sunday (January 31st) one of the labourers picked up the bird amongst the rocks of the south end of Herm, and brought it into the inn, where I had an opportunity of examining it: it had just begun to decompose, the eyes being much sunk; the neck and legs were quite supple, showing that "by poison he died;" it was a male bird of the year and in good plumage, though the tail-feathers were rather soiled and rubbed at the tips: the keeper had called it a "golden eagle," but it was only a whitetailed. In all probability this bird was mated with the other eagle which was obtained on Herm about three or four months ago, also by the gamekeeper and by the same means, and I think taken notice of at the

time in 'Land and Water:' these two birds, male and female, are now at Mr. Couche's, birdstuffer, here, the one stuffed and the other to be stuffed for the gentleman who owns the island.

Herm swarms with rabbits and with rats: of the former I heard that five thousand had been sent off during last season. The island only contains about seven hundred acres altogether, and only a small portion in the centre is cultivated. The rats I am told, however, are even more destructive than the rabbits, and a whole field of wheat has been destroyed principally by them: little heaps of half a dozen or more dead ones are to be seen every here and there, showing the able workmanship of the keeper and his steel-traps and strychnine. Mr. Purday, the landlord of the little inn here, and a capital seaman, &c., informed me that occasionally the rats have been found, at low tide, drowned, with the tip of their nose or tongue held fast between the edges of the limpet-shells and the rock, thus having paid penalty for their curiosity. About this period we had extremely rough weather and high tides, and Purday, who crosses every day to Guernsey, weather permitting, could not put to sea. The crossing is only about three miles, but nearly half way across from Herm to Guernsey a great field of sunken rocks stretch out, and these, together with the cross-tides and an otherwise stormy sea as well, make the crossing in rough weather dangerous even to those accustomed to the coast. During the days these gales lasted, Purday, who is quite "well up in shells" assisted me in my excursions at low tide, and, as he knew all the localities, greatly helped in swelling the number of my specimens: he also procured for my mother various sea anemones, hairy urchins and other sea wonders, to be painted. One anemone was apparently very common here: the name I found out is "Peachii," whether they are common elsewhere or not I do not know, but I have never observed them myself on any former occasion. We also got a worm dug out of the sand, which I was told was very rare; I forget the name, but perhaps some of your readers might recognize it from the fact that under the microscope the filament or skin presents to view a great number of little sack-looking vesicles exactly the shape of a ship's anchor.

I hope to go to Serk soon, and if there be any notes worth sending I shall forward them to you after my return from that island.

JOHN A. HARVIE BROWN.

St. Peter Port, Guernsey,
February 8, 1869.

Collected Observations on British Reptiles.

By EDWARD NEWMAN.

THE number of reptiles inhabiting Britain is so small that it is difficult, if not impossible, to give any satisfactory idea of their affinities or of the general characters of the class to which they belong, unless we emancipate ourselves entirely from the geographical restrictions which these small islands impose on us, and regard both the class of reptiles and its various divisions as they are ascertained to exist on the whole surface of the habitable globe. We learn from the records of travellers, verified by specimens in museums, that some seas are teeming with turtles, some rivers with crocodiles, some forests with huge boas, and some sandy deserts with lizards of every different structure. And we learn from the testimony of the eternal rocks that at some remote period huge reptiles peopled the earth to the exclusion of man, of sucklers and of birds. We must not, then, ignore either the past or the present prevalence of reptile forms, but must consider the class synthetically as a whole, analytically only as known in the small islands we chance to inhabit.

Reptiles constitute the third primary division of endosteate animals, and are distinguished from the members of the other three by the total absence of any deciduous covering of the skin. It has often struck me as remarkable that neither Linneus, Cuvier, De Blainville, Geoffroy St. Hilaire, nor Duméril and Bibron have noticed the simple and obvious external distinguishing character of reptiles. The epidermis, or outer skin, of quadrupeds is clothed with hair, of birds with feathers, of fishes with scales, but in reptiles it is uncovered, perfectly naked. It is not extraordinary that our natural-history book-makers, having no practical knowledge of the subject, should have overlooked so vital an omission, but it is extraordinary that the men whose names I have enumerated above, each one of whom thought for himself, failed to observe so important a diagnostic. When, in 1856, I published my little treatise on the 'Physiological Classification of Animals,' I had no idea that the distinguishing external or structural peculiarity of reptiles remained unnoticed. This omission is not simply such: it is accompanied by many positive errors; thus Merrem and others have a reptilian order Squamata, and Cuvier repeatedly uses the word *écailles* in describing the covering of snakes and lizards. The processes in question, whether described as *squamæ* or *écailles*, are projections, folds or rugosities of the under skin, and are not deciduous,

like hairs, feathers and scales, but are as permanent and durable as the bones themselves. This may be seen when the slough of a snake is found. This slough is continuous, and contains a faithful mould of each of these processes: it is a very beautiful and very instructive object. The tortoise exhibits the peculiarity of an *articulated skin*, the articulation being clearly discernible in the living animal, but becoming more conspicuous after death; when dehiscence takes place, and the plates fall off, perfectly detached from each other.

Reptiles are further distinguished from sucklers and birds by their generally colder blood, and from fishes by the possession of a neck susceptible of being bent at an angle with the body; by the absence of a lateral line; and by their mode of breathing, reptiles in their perfect state breathing by nostrils and lungs, fishes by the mouth and gills. Fishes, moreover, breathe water, or rather the air contained in water, reptiles breathing the atmospheric air. The breathing of fishes is rythmical, that of reptiles irregular and capable of long suspension.

Reptiles have a less equable temperature than sucklers or birds, the heat of their bodies being more under the influence of atmospheric changes. Nature secures the well-being of the bird by providing it with a thick clothing of feathers which maintain some degree of uniformity in the temperature of the body; but the reptile is preserved by a different arrangement, the temperature of its body rises and falls with that of the surrounding medium. Thus reptiles are rarely seen abroad in cold weather or in cold countries: their languid circulation does not enable them to resist the increased cold, and very many, on the approach of winter, bury themselves in sand, gravel or mud, or conceal themselves in the hollow of trees or under fallen leaves, and become apparently lifeless.

Compared with sucklers and birds, all reptiles seem apathetic as regards their young; that fierce care which is the characteristic of both those classes has few examples among reptiles; and this is one of those natural rules which seem proved rather than invalidated by the occasional exceptions: thus when we hear of a python incubating her eggs, or a toad carrying her little ones in the cavities of her back, we say at once, "How extraordinary! what a striking exception to the rule." In this, as in every investigation, we must take facts as we find them, and never presume to define what ought to be the course pursued by Nature in her infinitely various arrangements for the perpetuation of her creatures.

It is the character of all endosteate animals to be what is called tetrapod or quadruped—that is, either to have four legs or some of the bones required for four legs, even if applied to a different purpose, which is very frequently the case: thus in man the fore legs are converted into arms; in bats and birds into wings; in snakes they are mere useless rudimentary appendages scarcely protruding beyond the scales; and in fishes they are changed into fins. In the group which I have called Saurians are many snake-like animals, such, for instance, as the blind-worm, which are without external legs, and this has led naturalists to regard them as snakes; but we must not adopt this view: indeed Nature will assert her prerogative, and show us clearly, from time to time, that we are in error in all our artificial combinations; thus the blind-worm, whenever it is frightened, irritated or annoyed, will assert its saurian affinities by throwing off its tail, a feat which no snake has the power or the propensity to perform.

Reptiles are divided into two subclasses: first, *immutable reptiles*, which after issuing from the egg undergo no change of form or character; and secondly, *metamorphotic reptiles*, which first appear under a fish-like form, breathing water, and finally assume a reptilian form, breathing air;* together with these changes, and necessarily in connexion with them, they undergo a complete metamorphosis of internal structure. The immutable reptiles invariably have a harsh and dry dermal envelope, covered with inequalities called plates, crests, scutes and scales; while that of the metamorphotic reptiles is generally moist, often having what is called a mucous surface.

Subclass 1. IMMUTABLE REPTILES,

Are divided into four orders, commonly known as Tortoises, Crocodiles, Lizards and Snakes.

Order I. TORTOISES (CHELONIA),

Which have no teeth, but a bird-like beak comprised of two corneous mandibles, and in which the vertebral column, the ribs and sternum are greatly dilated, and all their edges soldered or anchylozed together, forming a complete box, in which the animal may be said to reside, as a snail in its shell, and from which it protrudes its head, legs and tail: in some genera the head and fore legs can be protruded, at the will of the animal, through an anterior, the tail and hind legs through

* See the recently published paper (S. S. 1529).

a posterior, opening; but in other genera the head and legs are always protruded and cannot be withdrawn. The bony case or shell is covered and inclosed by an indurated articulated skin, well known in some species under the name of tortoiseshell.

No species of this order now occurs in England or its seas. Formerly a species, still sufficiently abundant on the Continent, Emys lutaria, appears to have inhabited the broads of Norfolk, and recently a single example of the same species has once been found alive in an English canal. I therefore think it desirable to cite the description from Lord Clermont's most admirable work on the quadrupeds and reptiles of Europe, and also the two passages which refer to the subject as regards Britain.

FRESHWATER TORTOISE, *Emys lutaria.*

"Carapace wide, oval, more or less depressed; black, marked with yellow spots, varying in distance from each other, but arranged like rays, extending from the centres of the plates to their circumferences; the neck-plate is small; the plastron is attached to the carapace by a cartilage, and is movable before and behind; the tail is rather long, rounded and ending in a point; it is always shorter and thicker at its base in the males than in the females. Entire length from 9 to 11 inches. Lives in lakes and marshes, remaining generally buried in the mud: as winter approaches it comes to land, and passes that season in a state of torpor, hidden in some hole. The female lays her eggs in a dry place, but close to the water; they are white, marbled with ash-gray. This tortoise is widely spread over Europe, being found in Greece, Italy and its islands, the South of France, Hungary, Germany as far north as Prussia, the Crimea and shores of the Caspian Sea. In most of these countries the flesh is eaten (though not much esteemed) by the natives."—*Lord Clermont.*

This extremely pretty little tortoise is brought over from the Continent in hundreds, and often offered for sale in the streets of London at a very low price. It is very hardy, living in any tank or pond without any care, and not uncommonly surviving several successive winters; but I am not aware of any instance of its having produced young in the localities where turned out: it is too small, and too fond of concealing itself, to be a very desirable introduction, otherwise I imagine it might be naturalized with very little trouble. I now copy the evidence of occurrence in Britain, which of course is not to be taken as establishing its claim to rank as a British species.

"Some weeks since, when examining the large collection of animal remains in Mr. Birch's possession, all of which were, I believe, found on his estate in Norfolk, I found, to my surprise, some specimens far more interesting than any I had expected to meet with. They consist of some limb-bones and a considerable portion of the dorsal and sternal shields of two individuals of the European fresh-water tortoise (*Emys lutaria*), a species the existence of which at any time in the British islands has never before been suspected. These were found, as a label upon them in Mr. Birch's handwriting testifies, so long ago as June, 1836, in a peat-bog, by the side of a spring-pit, at East Wretham, about seven feet below the surface, and beneath some fifteen hundred laminations of a species of Hypnum, specimens of which were, I understand, submitted by Mr. Birch to Sir William Hooker, who declared the species to be Hypnum filicinum. I immediately communicated these facts to Professor Owen and Professor Bell, as being respectively the highest authorities on the fossil and recent reptiles of this country; and subsequently sent the remains to the first-named gentleman, who kindly determined the species for me, thereby confirming the view I had taken of them, but adding that they were somewhat larger than modern examples from Germany, now in the British Museum."—*Professor Alfred Newton, in Zool.* 8189.

"I was exceedingly startled to read, in the last number of the 'Zoologist' (Zool. 8190) an extract from Mr. Newton's essay 'On the Zoology of Ancient Europe,' in which he says the remains of a fresh-water tortoise have been discovered in recent peat in Norfolk. The following has been in print some months in a Supplement prepared by myself to a forthcoming work, by Sir Oswald Mosley, on the Zoology of this district:—'Cistudo europæa, *Cuv.* (The Spotted Marsh Tortoise). This species is introduced owing to an example having been captured, in the early part of the summer of 1857, on the banks of the canal near Burton. It is not a species that can be kept long in captivity; but it is probable it may have lived for a long period in the canal, or even have bred there, if accident had provided it with a mate. This animal is said not to take food excepting in the water. The individual in question died very soon after coming into my possession.' When I penned the above remarks I had no other idea than that my specimen, improbable though the supposition was, had been kept in an aquarium, and had escaped accidentally from captivity. With the evidence, however, adduced by Mr. Newton of the recent occupancy of this country by a fresh-water tortoise, it appears to me to be the less

improbable supposition to view my specimen as a truly British-born and indigenous individual. The names Cistudo europæa and Emys lutaria are treated as synonyms by some authors, but even should not that be quite correct, it is very probable a mistake may have been committed in naming the imperfect Norfolk remains Emys lutaria of Gray. The spotted fresh-water tortoise lives in lakes and marshes, some of which are situated in the extreme south of Europe, others as far north as Prussia, and it is said to bury itself in the mud during the greater part of the summer, and to hide in some hole on land in winter."—*Edwin Brown, in Zool.* 8238.

EDWARD NEWMAN.

(To be continued.)

Otter in Suffolk.—A fine male otter, weighing twenty-five pounds, was shot on the 20th of January at Halesworth: it passed into my hands for preservation.—*T. E. Gunn; 21, Regent Street, Norwich.*

Peregrine Falcon in Kent.—On the 18th of October I saw a large peregrine falcon flying over Cobham Park. Mr. Power records seeing one on the 1st of October, which might have been the same. I have been much pleased to see so many communications to the 'Zoologist' from Kentish naturalists, *viz.*, Messrs. Power, Hunter and Skinner. It is very interesting to compare my notes with theirs, as sometimes, as in this case, we seem almost to be speaking of the same bird, for Faversham is within twelve or fifteen miles of Cobham.—*Clifton; Eton, February* 1, 1869.

Peregrine Falcon near Brighton.—Another male was shot, on the 11th of February, near Rottingdean, by Mr. G. R. Guthrie: this, with the male of the 9th of November, makes the sixth obtained by that gentlemam.—*T. W. Wonfor; Hon. Sec. Brighton and Sussex Nat. Hist. Society.*

Lesser Kestrel near York.—Some time since the editor requested Mr. Newton to investigate a lesser kestrel said to have been obtained at Cambridge, and it turned out to be only the common species. Mr. Allis, however, informs me that a real one has been shot by a gentleman farmer near York and presented to the Museum.—*J. H. Gurney, jun.*

The Black Kite at Alnwick.—I am not aware that Mr. Hancock's black kite has been noted in the 'Zoologist.' It was trapped in the red-deer park at Alnwick, by a keeper who thought it was a "moor buzzard," and it came up to Newcastle, in the flesh, to Mr. Bates, a birdstuffer, on the 11th of May, 1866. It was rather bloody, therefore Mr. Hancock simply skinned it. Sir Robert Sibbald speaks of the "black gled" as a former inhabitant of Scotland.—*Id.*

Roughlegged Buzzards in Norfolk.—On the 2nd of December, 1868, a male was obtained at Mannington: weight two pounds and a half. A second bird, also a male

(immature), was shot at Rollesby, on the 27th of January last. I preserved both specimens.—*T. E. Gunn.*

Gray Wagtail and Pied Flycatcher in Kent.—Mr. Power, in the 'Zoologist' for January, says that the gray wagtail appeared on Rainham Marshes on the 8th of September: on that very day I saw one at Cobham, the only one I ever saw there: I did not see it again. On the 17th of September I was attracted by a small bird, looking like a miniature hen chaffinch, flitting about the branches of an oak: after some observation I perceived that it was a pied flycatcher in the brown and white plumage.—*Clifton.*

Early Nesting of the Thrush—I have to record two instances of the early breeding of the song thrush in Norfolk this season. A little boy named Cooke found a nest of five healthy young ones on the Eccles Hall Estate, on the 13th of January. On the 2nd of February a nest of young, fledged, were discovered in the fernery at Egmere House, near Wells.—*T. E. Gunn.*

Piebald Variety of the Blackbird.—A well-marked piebald variety (a female) of the blackbird was shot here a short time since. A singular fact connected with this variety has just attracted my notice, *i.e.* the female of this species is much less subject to variation than the male; for instance, out of every five pied blackbirds only one is a female—at least such is my experience in this neighbourhood. Perhaps that of observers in other districts may differ.—*Id.*

Dartford Warbler at Lyme Regis.—On the 14th of December, 1868, Mr. Gatcombe sent me a Dartford warbler, in the flesh, from Lyme Regis.—*J. H. Gurney, jun.*

White Sky Lark in Confinement.—Our local newspapers contained an account of a white sky lark being captured early last year, at Melton, in Suffolk: it was a fine young male bird and promises to make a first-rate songster. It is now (October, 1868) in the possession of Mr. Heffier, of Woodbridge.—*T. E. Gunn.*

Calandra Lark near Exeter.—In Newman's reprint of Montagu's Dictionary I observe the Calandra lark is introduced into the British list for the first time, on the authority of my friend Mr. Gatcombe. It may be of interest to know that Mr. Gatcombe has seen another in the possession of Mr. Byne, which that gentleman had got from Truscott, the Exeter birdstuffer, who said it was "a Lapland bunting," and killed near Exeter.—*J. H. Gurney, jun.*

Young Sparrows in December.—Yesterday (December 16), while out walking, I saw a young bird on the ground just before me, and gave chase. I caught it, and found it was a young sparrow just out of the nest, and not yet able to fly well. This seems to me so unusual an occurrence that I thought it would interest you. I noticed, too, another very rare event for this season. Last Sunday, whilst in church, a beautifully marked peacock-butterfly was crawling on the window-seat by my pew, fully developed. This I had noticed the Sunday before, near the same place, but not seemingly in so forward and lively a condition. Surely both instances mark the very mild weather we have had. At Southampton a nightingale was heard singing on the 7th of this month, not in a cage, but in a fence by the side of the road.—'*Land and Water.*'

Tree Sparrow and Blackheaded Bunting in Kent.—A large flock of tree sparrows frequented a small wood at Cobham this winter; and on the 6th of January I saw a blackheaded bunting, at some distance from any water.—*Clifton.*

Goldfinch, Mealy Redpole and Lesser Redpole in Kent.—During December and January I saw, at different times, four goldfinches, one mealy redpole and about twenty lesser redpoles, all in the same vicinity—some large ponds fringed with alder-tree, at Cobham.—*Clifton.*

Chocolate Variety of the Common Starling.—On the 13th of January a beautiful variety of the starling was shot at Horstead, and forwarded to me for preservation: it is an adult female, its plumage being of a pale chocolate on its head, neck and breast, the latter much paler, and the former tinted with purple reflections; the back of a pale reddish yellow, the feathers tipped or edged with darker colour; wings and tail white, some of the feathers of a pale reddish yellow, and others only edged with the same tint; eyes, bill and legs much paler than in ordinary specimens.—*T. E. Gunn.*

Extraordinary Migration of Pigeons.—On Thursday morning, a most wonderful host of pigeons passed over this district at daylight. The birds were first observed flying high in the air from north to south. I do not exaggerate when I say that millions must have passed between daylight and eleven o'clock. At one time they were so numerous as to seem like a dark cloud passing athwart the sky. Can these be wood pigeons in such astounding numbers? Such they certainly seemed to be; and if they are not cushats, what are they? There can be no doubt as to their being pigeons of some kind.—*From the 'Field.'*

Extraordinary Migration of Pigeons.—Referring to the migration of pigeons noticed by your correspondent from Barnet, I had seen them near here for about a week before the day mentioned by him. They came over my house three or four times, and I should say the flock must have been at least a mile long, and there could not have been less than 8000 or 10,000 of them. There is no doubt that they were common wood pigeons, as one morning about 500 out of the flock settled on some trees close by the house, and I had a good opportunity of seeing them. I have never seen them since the day named by your correspondent; and as a friend of mine at Tottenham, and another at Sydenham, also observed them about the same time, I have no doubt that they left the neighbourhood. I hoped to have heard of them again in your last impression, and write this in the hope that we may hear where they have gone to.—*Evelyn Fairlie; Elm Lodge, Cheshunt, Herts, January* 11, 1869.—*Id.*

Offer of Parasites from the Gold Pheasant.—Having some parasites from the above-named bird I shall be most happy to distribute specimens on receipt of stamped address.—*T. E. Gunn.*

Pheasant containing Egg in January.—Having received a hamper of game from Devonshire on Saturday, my servant in trussing a hen pheasant found a nearly full-formed egg within. This appears to me a very unusual occurrence at this season of the year.—*Joshua Jeffery; 15, Newcastle Street, Strand, January* 12, 1878.—*From the 'Field.'*

Partridges Nesting in January.—I think it worth while to mention that a partridge's nest of eight eggs, nearly hatched, was found a few days ago in a field on the glebe land of King's-Nympton, North Devon, by a farm labourer.—*Henry Byne; Miligan Hall, Bishop's Hull, Taunton, January* 9, 1869.—*Id.*

Partridge containing Egg in Winter.—Some game arrived here on the 17th of December, from a friend who resides near Congleton, in Cheshire. One of the partridges, on being opened, was found to contain an egg fully formed. It is now in my

possession. The bird was, I believe, shot on the 15th of December, and was in good condition.—*F. Arber;* 40, *Upper George Street, Bryanston Square, W.*—[Although the partridge is generally considered to be very regular in its breeding habits, we have known of several instances of its laying at this season of the year. In 1863 a perfect egg was sent us from Norfolk, taken from a partridge killed on January 4. A few weeks later a correspondent sent us an account of a nest found near Gloucester, which contained three partridges' eggs. And in the 'Field' of February 8, 1868, Mr. Lloyd records the fact of a young partridge being seen on February 4, in the act of clearing itself from the shell, while three other eggs remained in the nest; so that these eggs must have been laid very early in January. As a rule partridges do not begin to lay till the end of April or the beginning of May, and, having laid their full complement of eggs, begin to set about the last week in May.—*Ed. of 'Field.'*]

Creamcoloured Moor Hen.—A very interesting specimen of a creamcoloured moor hen was recently caught at Russell Farm, near Watford, Herts, by Mr. W. F. M. Copeland, who has had it preserved in a case with one of the ordinary black colour, so that the difference of plumage is strongly shown. Mr. Copeland has kindly deposited the birds at our office, where they may be seen by any one interested in these singular variations.—*'Field' Newspaper.*

On the Variation in Colour of the Axillary Plume of the Golden Plover. By JOHN CORDEAUX, Esq.

IN the February number of the 'Zoologist' (S. S. 1544) I remarked that the colour of the axillary plume of the golden plover is not always uniformly white, but is occasionally more or less edged and broken with smoke-gray. In consequence of this remark, I have since received, from Mr. J. E. Harting, an interesting communication on this subject, which, with his permission, I now copy for the benefit of the readers of the 'Zoologist.' I trust that other naturalists will examine the question, and communicate the result of their observations.

Mr. Harting writes as follows:—

"There are said to be four species of golden plover, namely, the European (*Charadrius pluvialis*), which has also been found in Africa;* the Asiatic (*C. longipes*); the American (*C. virginicus*); and the Australian (*C. orientalis*), which is probably the bird found in Japan.†

* Hartl., Orn. W. Africa, p. 215.

† Temm. & Schleg., Faun. Jap., p. 104.

"I have great doubts as to the three last being specifically distinct. They all have the axillary plume smoke-gray (instead of white, as in C. pluvialis), and, except in point of measurement, this is the only respect in which they appear to differ from the European bird.

"Between themselves, as it seems to me from a comparison of several skins, they differ only in the relative proportions of bill and tarsus: the slight variations in size and colour (especially of the tail-feathers) being attributable to the age of the individuals, and to the seasons at which each is obtained.

"No one of the three, C. longipes, C. virginicus or C. orientalis, has as yet been recorded as visiting the British islands. Your observations, therefore, at once give rise to the question, Does the golden plover found in Lincolnshire, with the axillary gray, or partly gray, belong to one of the three species just named, or is it merely a variety of C. pluvialis, showing that the colour of the axillary plume is not constant, and therefore of no specific value?

"Should it be proved that the colour of the axillary plume in C. pluvialis is often variable, as suggested, then I should be inclined to say that the characters upon which the four species of golden plover have been founded, are really insufficient to constitute them distinct, and that there is but one species after all, whose geographical range, like that of the gray plover (*Squatarola helvetica*), is world-wide, so far as is known."

From these remarks it will be gathered that an important question is raised on the difference between "species" and "variety."

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire.

A Buffcoloured Woodcock.—About a fortnight ago I shot in Galway, in the wood of Garryland, about two miles from Gort, a buffcoloured woodcock. The bird had the same marks and was of the same size as the ordinary bird, but his plumage was in different shades of light buff instead of brown. I have sent him to a birdstuffer in Dublin to be set up.—*Robert B. Templer; Loughgall, Co. Armagh, December* 26, 1868.—*From the 'Field.'*

Black Swan, &c., on the Solent.—I have for preservation the following birds, shot on the Solent waters:—Black swan shot in September last; great crested grebe, in December; a great blackbacked gull and a male pintail duck in January, 1869. Wild fowl have been scarce this winter, owing to the mildness of the weather.—*John Wright; Lymington, February* 17, 1869.

Parasitical Worms in the Stomach of a Redbreasted Merganser.—I purchased an immature male of this species on the 7th of December last, and in dissecting it I found in the entrance to its stomach some worms thirty in number, and apparently of the same species as those I have previously mentioned in the 'Zoologist' as having been taken from the cormorant. I have them in spirits.—*T. E. Gunn.*

Great Crested Grebe at Hempstead, in Norfolk.—A great crested grebe was shot at Hempstead, in Norfolk, on the 8th of November, and another (which I saw in the flesh) on the 28th at Grantham, in this county.—*J. H. Gurney, jun.*

Great Auks for Sale.—Prof. Newton informs me that Frank, the dealer, at Amsterdam (Vijzelstraat, B. B. 619) has a great auk, for which he is *only* asking £125. Herr Wilhelm Schlüter, No. 17, Halle a S., Prussia, has another for sale. I learn from my father that a skin from Coventry is likely to be sold in London shortly; and I know of a fourth example in private hands to be disposed of—an average specimen, in full summer plumage. It must be some time since so many have been in the market.—*Id.*

Little Gulls in Sussex.—In the February number of the 'Zoologist' I mentioned that several of these birds had been taken near Brighton. I now find nine specimens have been obtained in this county: one at Hastings, two at Eastbourne and six at or near Brighton. At Eastbourne seven were seen and one was obtained: they disappeared for a few days and then only four were seen together: one of these was shot, after which the remaining three took their departure; all the specimens obtained were young birds. Query, were they all the same flock?—*T. W. Wonfor.*

Voracity of the Common Gull.—On the 27th of January, in dissecting a specimen of the common gull, I found a young water vole, almost entire (about half the tail only being gone) in its stomach, the head being swallowed foremost. It measured five inches in length.—*T. E. Gunn.*

Food of the Fulmar.—As corroborating a note of mine on the food of the fulmar (Zool. S. S. 1483), I may mention that Dr. Saxby has also found the jaws of cuttlefish in the stomach of this species.—*J. H. Gurney, jun.*

Early Birds' Nests.—During the last week in January a gentleman, near Maidstone, found two nests, one a blackbird's, the other a thrush's—one with young, the other with eggs. A gentleman also brought into the market a pea-stalk with blossoms and a few just in pod.—*David John French.*

The Crow Blackbird a Robber.—Three years ago this spring there came into our village a flock of a dozen or more of the common crow blackbird (which are plenty in the country above here), for the purpose of building their nests in the tall Lombardy poplars in our streets, and they have been with us each season since, leaving whenever the young can fly. Until this season they have made their nests only in the poplars, selecting places near the trunk, where the clusters of nearly upright limbs secure them from ordinary observation. This spring they have appeared in greater numbers: two pairs have built their nests inside the spire of a church, passing through the openings of an ornamented window high up above the tops of our tallest trees. A bell is in the tower of the steeple below, and is rung at customary times, and a colony of doves is in the section near the bell. The writer has just discovered that the blackbirds have taken possession of a martin-house in his garden: they are busily engaged carrying in materials for nests, and the martins are flying helplessly about. Also, in the top of the pyramidal trellis covered with vines, forming the lower half of the support of the

martin-house, a pair are building: it is a place used some years ago by robins; but the fact was so novel that, instead of driving them off, a new martin-house is to be put up at once near by, which the martins, in their necessity, will no doubt occupy. The blackbirds are tame about our streets and gardens, alighting on the ground at the same time with the robins, with much the same habits in this respect, although evidently going beyond the limits of the village for most of their food. We have robins in large numbers,—small birds being protected by law,—and on the arrival of the blackbirds the *first* season there was trouble among them, and their note, denoting disturbance, could be heard on every side; and for good reason, for the blackbirds, without so much as saying "by your leave," took the materials from every unfinished or unoccupied robin's nest they could find; but, singularly enough, the blackbirds soon succumbed, and the robins drove them away in all cases of contest; but they seem to live in harmony, and, as I have mentioned, are often in company on the ground seeking for food.—*Newark (New York) Correspondent in the 'American Naturalist,' August*, 1868.

The Robin at Fault.—A remarkable instance of the lack of the "bump of locality" in birds came under my observation some years ago. I had nailed a board of moderate width under the eaves of a barn to form a resting-place for the nests of the cliff or jug swallow: it was inclined at an angle, so as to form a sort of trough. A robin commenced building her nest in it; but, seeming unable to fix upon any particular spot, deposited the mud and straw along the entire length of the trough, about ten feet: after working several days she abandoned her task. Shortly afterwards I saw a robin (whether the same bird or not I cannot say) attempting to build her nest in the same way, along the entire outer cornice of a house, about thirty feet.—'*American Naturalist,' June*, 1868.

Galatea Andrewsii at Penzance.—I have to record the occurrence here, in seven fathoms water on sand, of Galatea Andrewsii of Kinahan. My specimen is a female, nearly full grown, and was kindly identified for me by Mr. Spence Bate. The specimen was taken by me in August last.—*Thomas Cornish; Penzance, February* 6, 1869.

The Locust Killer.—I never saw but one of these wasps, and that was about two years ago, and then only for a few moments: it appeared to be marked almost, if not precisely, like a hornet, and to be about two or two and a half inches in length, and large in proportion; truly a most formidable-looking insect. The "killer" had seized one of our August locusts, and was endeavouring to rise from the ground with it, the locust clinging to the grass, and fluttering and screaming [? *E. N.*] all the while. Before I could seize them they rose from the ground and made off in a bee-line, at a height of about twelve or fifteen feet, the locust resisting with might and main. I am told they make nests in the ground, boring a hole to the depth of two or three feet. They must be rare, or I should have seen them before.—*C. W. Taylor; Hulmeville, Pa.* [The wasp is probably the Stizus speciosus, which seizes the Cicada to store its nest with, which is probably not more than a foot in depth.—*Editors of 'American Naturalist.*']

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

February 1, 1869.—H. W. BATES, Esq., President, in the chair.

The President returned thanks for his re-election, and nominated as his Vice-Presidents Messrs. Pascoe, Frederick Smith, and A. R. Wallace.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Catalogue of Scientific Papers (1800—1863) compiled and published by the Royal Society of London,' Vol. ii.; 'Proceedings of the Royal Society,' Nos. 105 and 106; presented by the Society. 'Journal of the Linnean Society,' Zoology, No. 45; by the Society. 'Journal of the Quekett Microscopical Club,' Nos. 4 and 5; by the Club. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1868, No. 1; by the Society. 'Genera des Coléoptères,' Tome viii.; by the Author, Prof. Lacordaire. 'Essai Monographique sur les Oxybelus du Bassin du Léman (Insectes Hymenoptères),' par Frédéric Chevrier; by the Author. Newman's 'British Moths,' No. 26: by the Author. 'The Zoologist,' for February; by the Editor. 'The Entomologist's Monthly Magazine,' for February; by the Editors.

Exhibitions, &c.

Mr. Edward Saunders exhibited a specimen of Pachetra leucophæa, captured by Mr. N. E. Brown, on a gas-lamp at the Redhill Railway Station, on the 14th May, 1868.

The Secretary read a letter from Dr. W. Webster Butterfield, of Indianapolis, offering to exchange Lepidoptera of Indiana, U.S.A., for those of England.

Mr. Pascoe made some observations on the Coleopterous genera Aprostoma, Mecedanum and Gempylodes, with reference to the remark of Prof. Westwood (Proc. Ent. Soc. 1868, p. l.) that these genera would probably have to be united. M. Guérin's genus Aprostoma was by Prof. Lacordaire referred to the family Brenthidæ; at all events the insect from the Niger exhibited by Prof. Westwood was generically distinct, and in Mr. Pascoe's opinion abundantly distinct, from Gempylodes.

Mr. Pascoe exhibited a curious bug (perhaps an Odontoscelis) from the neighbourhood of Toulon; he had been unable to identify it with any species described by M. Mulsant.

Prof. Westwood gave an account of the new vine-pest, Rhizaphis, to which his attention was first called in 1863: its mode of attacking the vine was two-fold, or at all events specimens between which he could not find any difference, and which to all appearance belonged to the same species, caused damage to the vines in two very different ways. Some of them sucked the upper side of the leaf, and caused the appearance on the lower side of a gall, which was unique in its character; the upper coat of the leaf split into tooth-like or radiating segments, each with delicate white filaments; beneath this covering the insect sheltered herself, being visible through the interstices between the radiations, and was of the size of an ordinary pin's head; there she lay her eggs, which hatched immediately, and the mother and young together filled

the cavity or cell; the young, however, soon left her, and went to the younger parts of the plant, to commence depredations on their own account; a leaf would sometimes be covered with them. Prof. Westwood knew no other instance of an insect burying itself in this manner. The other mode of attack was by sucking the roots or rootlets underground, thereby causing decay and rottenness, and killing the vine; there was not any gall or swelling formed, but he had found the young ones with their parent on the roots. In the South of France whole vineyards had been destroyed; and the pest occurred in England, though whether or not introduced or imported with the vines he could not say. The female alone was known, no males having been detected. He should be glad to hear if any Member present was aware of any instance of the same insect attacking a plant both above and below ground in two such dissimilar ways.

Mr. Frederick Smith was able to mention an instance. The common Cynips aptera was well known to form clusters of galls on the fibrous roots of the oak; on one occasion he had found, in Bishop's Wood, Hampstead, on the stem of an oak tree, about a foot above the ground, a large lump which he could only compare to a number of barnacles fastened to the bole; he cut the lump off, took it home, and to his surprise bred therefrom between twenty and thirty specimens of Cynips aptera.

Mr. Charles Horne (who was present as a visitor) exhibited the stings of two scorpions which were killed by rats at Benares, on the 19th July, 1865; one of the stings shewed a large hole where it had been perforated by the tooth of the rat. The scorpion and rat were placed under a glass cover, and for some time the scorpion fenced about, tail over head, trying to get hold of the rat, but at a favourable moment the rat dodged down and made a rush at the scorpion, bit the sting through the middle, then placed its foot upon the scorpion, and began to pull off the legs at leisure. In India it was the constant habit of rats to destroy scorpions, and he believed they usually ate them; but in the case above described, the scorpion was not eaten by the rat.

Paper read.

The following paper was read:—"Description of a New Species of Hestina," by Mr. A. G. Butler. The species, Hestina Zella, from India, was described as being an excellent mimic of Danais Juventa, and most nearly allied to H. Mena of Moore.

February 15, 1869.—H. W. BATES, Esq., President, in the chair.

Election of Members.

Arthur Wynne Foot, Esq., M.D., of 21, Lower Pembroke Street, Dublin, was elected an Annual Subscriber.

Exhibitions, &c.

Prof. Westwood exhibited two parasites on bats from Ceylon, both Diptera, a Strebla and a Nycteribia, prepared for the microscope in Canada balsam. They were simply pressed between sheets of paper, an aperture having been made for the escape of the fluid matter, and whilst still moist were laid on the glass, and the balsam, heated over a spirit lamp and poured on hot, filled up the interstices and made the preparation transparent.

Mr. Butler exhibited a living locust of the genus Conocephalus: it had been received by Mr. Swanzy in London on the 2nd of February, and arrived on board a ship from the West coast of Africa. A swarm of them covered the decks, being at first green, but after about three days they became brown, probably from the absence of green food: notwithstanding exposure for some days to a very heavy sea, many specimens clung to the vessel and arrived in the Thames alive. The one exhibited had taken nothing since its arrival but a little water, except on one occasion when it was compelled to clean its face of some sugar which Mr. Butler placed on it.

Mr. F. Smith exhibited a collection of honey bees from all parts of the world, and solicited the loan of foreign species, the localities of which were known, to extend his knowledge of their geographical distribution and assist him in the preparation of a memoir on the honey bees supplementary to that published by him some few years ago in the 'Annals and Magazine of Natural History': it was very desirable to obtain all the sexes of all the species, as the workers alone did not offer sufficiently marked characters to determine the identity or specific distinctness of many of the forms. Among the bees exhibited there were, a queen of Apis mellifica which was with difficulty to be distinguished from a worker; all the sexes of Apis Ligustica and fasciata (the latter, in the opinion of Dr. Gerstäcker was only a variety, but Mr. Smith thought he could show its distinctuness); the male and worker of A. Indica, sent by Mr. Atkinson. of Calcutta; a queen, sent by Mr. Lewis from Japan, very closely resembling the common A. mellifica; specimens of A. nigrocincta (considered by Gerstäcker to be a variety of A. Indica); all the sexes of A. floralis, the smallest known honey bee (the worker of which is the A. lobata of Smith); A dorsata, the largest and commonest in India and the Eastern Archipelago (of which A. testacea was only a variety); and all the sexes of a bee from the Cape of Good Hope which might be only A. Ligustica, but was considerably larger. Mr. Smith also exhibited pieces of the comb of various species; the worker cells of the above-mentioned bee from the Cape were one-tenth smaller than those of A. mellifica, ten of the former being equal to nine of the latter; the cells of A. Indica were still smaller than those from the Cape; the combs of A. floralis, like those of A. dorsata, were attached to branches of trees; lastly, there were some cells of A. dorsata, made of the same material as the rest but an inch and a half in depth, which Mr. Smith supposed to be honey-cells.

Mr. Druce exhibited a collection of butterflies from Nicaragua, brought to this country by Mr. Thomas Belt. Amongst them was a new Papilio, near to P. Sesostris; and a series of Heliconiidæ representing four genera, but which looked like one species, the whole of them being found flying together. Ten or twelve new species had been obtained by Mr. Hewitson out of Mr. Belt's collection.

The President had obtained some handsome new species of Coleoptera, also from Mr. Belt, the scene of whose operations was the neighbourhood of the Chontales mines. Nicaragua was divided in the middle, the Atlantic side being forest, the Pacific side savannah and open grass-land; Chontales lay on the edge of the Atlantic belt of forest, and in consequence of the development of the mines there had been considerable felling of timber, and most of Mr. Belt's Coleoptera were brought to him by the wood-cutters: there were some very fine forms of Stenaspis, Colobothea, Amphionycha, Oncideres, Anisocerus, &c., &c., and it seemed as if the tropical types culminated in size and beauty in Nicaragua. So far as American Coleoptera were concerned (though he could not say that he had observed the same thing in other

orders), it seemed that at and near the Equator the species were comparatively dull in colour, but brighter hues were assumed both in the North and South tropics.

Mr. A. R. Wallace thought this held good in the East also. The beetles of Borneo were generally dull in colour, whilst more brilliant forms were found both in Ceylon and China, in Java and Australia. The excessive uniformity in the character of the vegetation was perhaps the cause of the prevailing dullness of the beetles found within the equatorial belt.

By an unanimous vote the Secretary was requested to express to the Rev. T. A. Marshall, on behalf of the Members of the Society, their sympathy and condolence with him on the recent loss, through the foundering of a ship between Melford Haven and Barnstaple, of the whole of his library and manuscripts and collection of insects. The destruction of his minute British Hymenoptera belonging to groups but little studied, and of the types of species characterized by Mr. Marshall, was more than a private misfortune, and was an irreparable loss to Science.

Paper read.

The following paper was read:—"Description of a new Genus and Species of Prionidæ," by Mr. Edmund Thomas Higgins.

The new form was named Ommatomenus sericatus, was allied to Tithoes and Dorycera, and was described as connecting the Acanthophorus group of the Old World with the Derobrachus group of the New World. It was found near the mouth of the Niger, and the Acanthophorus megalops of Mr. Adam White, from Fernando Po, was indicated as belonging to the genus Ommatomenus.—*J. W. D.*

The Elephant and the Railway.—A correspondent writing to the 'Indo-European Correspondence' from Monghyr, under date the 21st ult., states that "A very serious accident, brought about in a manner unknown and perhaps unheard of since the establishment of railways, not only in India, but throughout the world, happened to a train last evening at half-past 8 P.M., between Sahebgunge and Mirzapore, about two miles from the latter station. At that time the No. 5 down goods train was approaching a mangoe tope, in which some seventy elephants were stationed. The red lights glaring in the distance, and the noise and smoke of the engine, would seem to have caused an awful consternation among the poor brutes, all of whom more or less tried to break away from their fastenings. One large male, however, the strongest and most courageous of the lot, became so infuriated that he broke his chain and rushed forward to intercept and encounter the supposed enemy. He had scarcely placed himself on the line when the train was down upon him: he encountered it with head and tusks; but animal strength proved no match for steam and machinery—the poor brute was knocked down and killed on the spot, and the engine, rebounding, ran off the line, and it and eleven carriages were capsized into a ditch. The fireman luckily managed to jump off in time, and the guard did the same, but the poor driver, named Smith, remained in his place, and received injuries from which it is not expected he will recover.

Notes on the Zoology of Newfoundland.

By HENRY REEKS, Esq., F.L.S., &c.

Letter 1.—ORNITHOLOGY.

BEFORE commencing a systematic list of the avi-fauna of Newfoundland, it will perhaps be necessary to say a few words on the island itself. Newfoundland, as my readers are probably aware, forms one of the valuable British colonial possessions on the coast of North America. Its geographical position lies between lat. 46° 37′ and 51° 40′ north, and long. 52° 41′ and 59° 31′ west: it is bounded on the north by the Straits of Labrador, on the west by the Gulf of St. Lawrence, and on the south and east by the Atlantic Ocean, and has a seaboard of nearly two thousand miles. There is a chain of mountains, or rather in many places high table-land, running almost throughout the island in a N.E. and S.W. direction. The low land is made up of vast savannas, intersected by extensive woods, lakes and rivers—one inland lake alone being sixty-five miles long, and containing an island as large as the Isle of Wight, and which seems to have been the last stronghold of the Red Indians. Since the extermination of this persecuted race (which probably took place not more than thirty years ago) the whole of the interior of the country has been uninhabited. Several "histories" of Newfoundland have appeared from time to time, and among the best of these I may mention one by Chief Justice Reeves, published in 1793, another by Anspach in 1820, and the last by the Rev. C. Pedley in 1863; but, strange as it may appear, none of these authors give any reliable information on the natural history of this extensive island; which, besides being rich in its fauna and flora, will, I have no doubt, prove equally so in minerals. In some places I have also seen as good a surface-show of petroleum oil as in the well-known oil-regions of Pennsylvania. A two years' residence, under the most favourable circumstances, in a country nearly as large as England, and where the forests are still primitive and in many places almost interminable, is scarcely sufficient time to warrant anything like a correct list of the animals or plants; but when impeded by such a severe accident as I sustained from frost, and which kept me a prisoner to the house for several months, no other apology is necessary for the incompleteness of these "Notes," which none can possibly regret more than the writer. There are few

inhabited countries, perhaps, on the face of the globe, where the naturalist gets less assistance in the oological department than in Newfoundland. The whole and sole occupation of the settlers on the north-west coast is fishing and furring,—the former in summer and the latter in winter,—and upon their success entirely depends the stock of provisions they will be enabled to obtain, by barter with the traders, for the long period of nine months, when no vessels visit the unsafe harbour of Cow Head. Of course the postal arrangements there are not exactly A 1—never exceeding *one* delivery a day, and this at intervals of from one month to six weeks in June, July, and August, and usually *not at all* between the first of September and 1st of the following June. During the nesting season the assistance of a man worth anything could scarcely be obtained under a sovereign a day, and then, for want of knowledge of those birds not used as food, he may bring you a lot of eggs unknown and unidentified, and consequently worthless. My plan was probably better: I offered a fair reward for all eggs with which I was tolerably familiar; and although I got but few, I ran a far less risk of paying for worthless articles. Although I am answerable for all statements in these "Notes," except when otherwise expressly stated, my friend Prof. Newton—than whom no one is more competent—has kindly undertaken to look through the list previously to publication, for the purpose of calling my attention to any passages which may require further verification or particularizing, and thereby enhance their value. I have much pleasure in addressing these "Notes" to Mr. Spencer F. Baird, of the Smithsonian Institution, and Mr. G. N. Lawrence, of New York, in remembrance of their kindness to me during my stay in the United States. The classification and nomenclature of the authors of "Birds of North America" has been adopted in the following list.

FALCONIDÆ.

Pigeon Hawk (Falco columbarius, *Linn.*)—This beautiful little hawk, so closely resembling the merlin (*F. Æsalon*), is a summer migrant to Newfoundland, and is tolerably common: its food consists chiefly of small birds, especially some of the smaller species of Tringæ, which abound on the coast in the fall of the year. Since my return I have compared specimens of this species with others of F. Æsalon, and, although I cannot find any material or reliable difference in *size*, the species are easily separated by examining the tails. Both sexes in F. columbarius have *four distinct* black bars—

three exposed, and one concealed by the upper tail-coverts. In F. Æsalon the female *only* has the tail-bars distinct, and they are *six* in number—five exposed and one concealed. The bars on the tail of the adult male F. Æsalon, although *six* in number, are only partially defined, and consequently very indistinct. The bill of F. Æsalon is slightly more compressed laterally, but not so much so horizontally as that of F. columbarius. The tibiæ in my adult male specimens of the American bird (F. columbarius) are darker ferruginous, with narrower longitudinal lines, than in my English specimens of F. Æsalon; but this distinction may not be constant. I had almost forgotten to state that the inner webs of the tail-feathers of F. columbarius are white, except where crossed by the black bars—in this respect differing from F. Æsalon, which has scarcely any variation in either web, both being bluish ash.

Greenland Falcon (F. candicans, *Gmelin*).—This is the "white hawk," of the Newfoundland settlers. It is pretty regular in its periodical migrations, especially in the fall of the year. I was not successful in obtaining specimens; I do not think it breeds in any part of Newfoundland.

American Sparrow Hawk (F. sparverius, *Linn.*)—A summer migrant to Newfoundland, but not so common as F. columbarius.

The following species of Falco may reasonably be expected to occur (and probably do so) in Newfoundland occasionally:—The duck hawk (*F. Anatum*) and the Iceland falcon (*F. islandicus*).

American Goshawk (Astur atricapillus, *Wilson*).—I have only the authority of the settlers for including the "goshawk" in my list of Newfoundland birds. I have no reason to doubt their accuracy, as the more enlightened on Ornithology recognised the plate of this species in Faun. Bor. Am., where the scientific name only is given.

Cooper's Hawk (Accipiter Cooperi, *Bonap.*)—A summer migrant; not uncommon.

Sharpshinned Hawk (A. fuscus, *Gmelin*).—A summer migrant, and about equally common with the preceding. I have not seen the young of this species, but the adult very closely resembles our sparrow hawk (H. Nisus) both in flight and plumage. I have not, however, compared specimens, but hope to do so before the conclusion of these "Notes," and give the result.

Redtailed Hawk (Buteo borealis, *Gmelin*).—A summer migrant, but not so common as on the mainland. I only examined one specimen, shot in Newfoundland.

The following species of Buteo probably occur on the island:—The redshouldered hawk (*B. lineatus*, Gmel.) and the broadwinged hawk (*B. pennsylvanicus*, Wilson). I think I have seen the latter on wing, but obtained no specimen.

Black Hawk (Archibuteo Sancti-Johannis, *Gmelin*).—Common; more especially in the immature plumage, in which state some specimens so closely resemble A. lagopus that it is hard to distinguish between the species. I had an individual of the former species —A. Sancti-Johannis—which agreed so well with descriptions of A. lagopus that I named it as such in my note-book. I kept this specimen alive for upwards of two months, and fed it almost entirely on trout (*Salmo fontinalis*), to which it seemed particularly partial, but invariably refused smelts (*Osmerus viridescens*), either dead or alive, and fresh from the water. I never tried any other specimens of fish, and cannot account for the bird's dislike to the smelt; it may have been the peculiar cucumber-smell—certainly not the taste—which this delicious little fish possesses. I do not think A. Sancti-Johannis a "fisher" by nature; at least, I never saw it in the act of fishing. Unfortunately I did not preserve the skin of this bird (the feathers got rather shabby during confinement); had I done so, I think it would have puzzled more than one good ornithologist to separate it from skins of the European A. lagopus, inasmuch as the under surface of the body was no darker than ordinary specimens of A. lagopus, although I never examined any afterwards but what were, as a rule, much darker. My bird was a female and measured twenty-three inches, wing sixteen and three-quarter inches, and, from the appearance of the ovary, would have laid the following year (1867). The black hawk—or, rather it should be buzzard—is a summer migrant to Newfoundland, but, as a rule, remains later in the fall than most of the Falconidæ.

American Hen Harrier (Circus hudsonius, *Linn.*)—Although one of the most abundant hawks in the Atlantic States of America, and said by my old friend Downs to be equally common in Nova Scotia, I did not, strange to say, obtain a single example in Newfoundland, although I found some of the settlers knew the bird by its white rump, and distinguished it by the name of "hen hawk." I am almost certain of having seen it on wing myself at Cow Head. Without specimens, it is impossible for me to say in what peculiarities of plumage (if any), &c., this bird differs from the European C. cyaneus.

Bald or Whiteheaded Eagle (Haliæëtus leucocephalus, *Linn.*)—This handsome bird is called the "grepe" in Newfoundland. It is tolerably common, but as the settlers increase, this noble bird gradually, but surely, decreases. Twenty years ago, or even less, several eyries existed in the immediate neighbourhood of Cow Head, but at present the sites only remain; it is said to breed on a peculiar island-rock, called "The Prior," in the mouth of the Bay of Islands. I have, on more than one occasion, seen the "grepe" fishing at Cow Head and Bonne Bay, and obtained one egg from the latter place. The nest was built in a large pine-tree, and contained two eggs—one addled: the egg is very similar to that of H. albicilla.* The bird is only a summer migrant to Newfoundland.

It is not improbable that Aquila canadensis may eventually be found to visit Newfoundland.

American Osprey, or Fish Hawk (Pandion carolinensis, *Gmel.*)—This fine species is common in Newfoundland: it is a summer migrant, coming in May and retiring in the early part of October. Often, on a calm summer's evening, as I lay on the grass smoking my pipe, have I watched two or three pairs of these birds fishing in the harbour. Suddenly the slow circling flight is stopped,—the quick eye discerns its scaly prey,—the body assumes an almost vertical position; the wings for a moment vibrate rapidly, as if to give their owner impetus, and then with almost unerring aim, like an arrow from a bow, the osprey drops into the water. In a few seconds he reappears, and rising a few feet from the water, the rapid vibration of wings is again observable, but this time only to drive the claws more firmly into the sides of his finny morsel, with which he slowly sails away to some high tree in the woods, where probably is a nest,—

"Itself a burden for the tallest tree."

This beautiful hawk does not escape the ruthless "gunners" in Newfoundland, although utterly useless after death to the settlers. The osprey builds in trees in the extensive woods, either near the sea-coast or some inland lake. The eggs which I obtained from Bonne Bay cannot be distinguished from European specimens received from the late Mr. Wheelwright. Having no English specimens of the osprey

* In the Proc. Zool. Soc. for 1863 (p. 252) Dr. Sclater recorded H. albicilla as a Newfoundland bird, an error which he corrected in the 'Proceedings' of the same Society for 1865 (p. 701).

by me, I am unable to point out any differences whereby they may be selected from American examples. The authors of 'Birds of North America' give none; both Wilson and Audubon considered the European and American osprey of the same species.

STRIGIDÆ.

American Barn Owl (Strix Pratincola, *Bonap.*)—Apparently rare in Newfoundland: I only examined one specimen during my residence there, which, having only the first joint of the wing broken, was kept alive several days by the children of the man who shot it: this occurred in August, 1866. It is probably a summer migrant.

Great Horned Owl, (Bubo virginianus, *Gmel.*)—Visits Newfoundland for the purpose of nidification, and is not very uncommon during that season, and more especially later in the summer when the young leave the nests. It is called the "cat owl" by the settlers. The only nest which came under my observation was built *on the ground*, on a tussock of grass in the centre of a pond. The same nest had been previously occupied for several years by a pair of geese (*Bernicla canadensis*). I think it the more important to note this observation (which, however, may not be constant even in Newfoundland, as birds of prey are very varying in this respect) as Mr. E. A. Samuels, in the 'Birds of Massachusetts,' says it "nests in hollows of trees, and in high forks of pines."

HENRY REEKS.

(To be continued.)

Life-Histories of Sawflies. Translated from the Dutch of M. S. C. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.

(Continued from Zool. S. S. 1471).

NEMATUS AURANTIACUS, *Hartig.*

For the imago see *Hartig, Blatt-und Holzwespen*, p. 197, No. 25. Larva undescribed.

Nematus niger, antennis subtus, ore, prothorace, pleuris, pedibus et alarum stigmate flavis aut luteis, abdomine aurantiaco.

In the beginning of June, 1846, I met with a whole family of the larvæ of this insect, feeding on poplar in one of the lanes near the village of Warmond; I took them home, where I fed them, and, after

having made drawings of them, I had the good fortune to succeed in rearing the perfect insect.

The larvæ in question were one centimetre long, the head was shining black, the jaws dark brown, the six thoracic legs were black at the bases—and further, as far as the claws, purplish brown. The first three segments of the body were deep- or orange- yellow, the fourth greenish yellow, the six following clear green, the last two again were deep yellow; the twelve abdominal legs were green, the two anal legs yellow. On the first segment were six small shining black spots, on the three following nine longitudinal rows of two spots each, of which those above the legs were confluent—or, on each segment, two transverse rows of nine spots. Above the legs, on either side of the following six abdominal rings, were two elliptical spots placed diagonally one above the other; above these were three smaller vertical elliptical spots, succeeded by two larger round black ones. On the last two segments were seven or eight dots on either side, nearly every one having a short black hair; there were no spines on the last segment; between the legs on the ventral surface, which was green, were six green-coloured glands.

These larvæ, after feeding on the leaves, spun up among them and the mould on the 6th, 8th, 9th and 10th of July. The cocoons (fig. 6) were gray or brownish yellow, with a coarse and veined exterior of a brown colour; they were 9 mm. long. In the warmest part of the summer this insect appears to require not more than seven days for the passage from larva to imago, as on the 14th I found an imago (a female) had made its appearance. On the same day I also found among the cocoons a pupa, the larva of which had apparently omitted to spin a cocoon. This pupa, represented at fig. 5, was glassy; thorax and anus yellow; dorsum greenish; the legs, palpi and antennæ white; the eyes black.

I frequently afterwards met with these larvæ, and, if I am not mistaken, I observed three generations, namely in May, June, and August. It was not until June 1862, that I had an opportunity of observing the eggs, when I had the good fortune to discover some on the same poplar on which I had also found Nematus vallator, Nematus pallicercus, and likewise many Lepidoptera. The eggs were arranged in a very remarkable manner (see fig. 1): they were so arranged along the margin of a poplar-leaf that one egg was placed on each of the teeth of the leaf; I counted twelve on one side of the midrib, and eight on the other, inserted between the surfaces of the leaf. A couple of days

later the young larvæ had made their appearance, and were ranged so closely together along the margin of the leaf (fig. 2) that each seemed to grudge the other the space it occupied, most of them having only room to hold on by the six thoracic legs; the anal extremity was almost continually in motion. About fourteen days later they were nearly full grown, when it was apparent that they belonged to the same species as those taken at Warmond: on attaining their full growth they were, however, nearly half as long again, being about 15 mm. These larvæ also produced the same imagos. The perfect insect is 8, 9, 10 or 11 mm. long; the male is smaller and darker coloured than the female. In both sexes the head is brownish black as far as the mouth, which is yellow; the antennæ are yellow underneath, the upper surface being fuliginous; the eyes are brown, and are surrounded—especially in the female—by a yellow border; the ocelli are topaz-coloured. Prothorax bright yellow, with a brown spot in the middle of the neck; mesothorax black, with some brown at the side in the male, which is replaced by a yellow spot in the female; metathorax brown-black (yellow beneath in the female.) Hartig speaks of a little yellow spot on the scutellum: I have not been able to observe this in my examples, which were taken inland. The cenchri are clear white. The female has the abdomen entirely orange; in the male this part of the body is spotted with brown or black on the dorsum, generally on the first two and the seventh segments. In the female the legs are yellow with brown claws, the posterior tarsi being brown on the upper side; in the male the bases of the posterior coxæ are black, the rest of the leg being entirely yellow, the brown tint being scarcely perceptible on the posterior tarsi. Wings transparent, with a yellow tinge in the female, and having a brownish purple glow at the base in the male; the costal nervure and the stigma are yellow, the latter being purplish at the base in the male. The nervures of the wing are of various tints of brown. The ovipositor and saw of the female are of the most simple structure, and offer nothing to call for special remark (see fig. 8). I may add that on the occasion of the excursion of the Netherland Entomological Society, in August, 1863, I saw the larva of this species in great numbers on a row of poplar trees not far from Wassenaar, near the villa of Ryxdorp.

Collected Observations on British Reptiles.

By EDWARD NEWMAN.

(Continued from S. S. 1598.)

Order II. CROCODILES (LORICATA).

Are covered with a very hard dermal envelope, which, on the back, is divided into departments or sections, each containing a somewhat square spongy bone firmly embedded in the skin, and forming part of the shield-like armature which has given rise to the name of Loricata. My late friend, Edward Doubleday, when in the United States, was at first puzzled with these curious substances: they were extremely numerous at a little bend of the river St. Johns, just below the town of Jacksonville in east Florida, but he soon found that they were the dermal bones of alligators, that had either died of a ripe old age—"exactis non infeliciter annis," or had fallen victims to the rifles of the militia and other troops constantly passing up and down the river in the steamers. The sections or divisions of the dermal envelope are generally furnished with a keel-like projection more or less developed, and these, being arranged in dorsal and caudal series, form long toothed crests, each series having somewhat the appearance of a gigantic saw. The legs are short and strong; the fore feet have five toes, and the hind feet four; the toes are usually connected by a swimming membrane; the head is long, and each jaw is furnished with a single row of deciduous teeth, which are renewed by new ones being formed within the base of the old, and pushing these out of their places: the lower jaw extends backwards beyond the skull, so that when the mouth is opened the upper jaw appears to be articulated and moveable as in parrots—but this is not the case; the upper jaw really forms an integral and very principal part of the skull; the tongue is fleshy and fixed in the recess between the branches of the lower jaw, not moveable and extensile as in endosteate animals generally. These creatures are strictly carnivorous; they inhabit the rivers of Asia, Africa, and America, and grow to an enormous size—sometimes, it is said, attaining a length of twenty-five feet, but I have never seen such in museums. None now inhabit Europe; indeed, the number of Loricata is everywhere diminishing: these huge reptiles are too powerful to amalgamate with Teutonic man; it is impossible for any community of interest to exist between him and

the Loricata: there can be nothing but antagonism, and we know what that means when the Teuton is one of the contending parties—the Loricata must go to the wall. A hundred years ago the Red Indian and the alligator were "tenants in common" throughout the Floridas. Honest William Bartram, who was sent thither by Dr. Lettsom, of London, to collect botanical specimens, and who has never been suspected of the slightest tendency to exaggerate, draws the following life-portrait of the alligator at home. The *locale* is the bank of the St. John's river, the very spot where so many years afterwards Edward Doubleday found their dermal bones in such abundance. "How shall I express myself," says Bartram, "so as to convey an adequate idea of the scene, and at the same time avoid raising suspicions of my veracity? The river in this place, from shore to shore, and perhaps nearly half a mile above and below me, appeared to be one solid bank of fish of various kinds pushing through the narrow pass of St. Juan's into the little lake on their return down the river, and the alligators followed them in such incredible numbers and so close together, from shore to shore, that it would have been easy to have walked across on their heads had the animals been harmless. What expression can sufficiently declare the shocking scene that for some minutes continued, whilst this mighty army of fish were forcing the pass? Thousands, I may say hundreds of thousands of them, were caught and swallowed by the devouring alligators. I saw an alligator take up several great fish at a time out of the water, and just squeeze them between his jaws, while their tails flapped about his ears and eyes ere he could swallow them. The horrid noise of their closing jaws, their plunging amid the broken banks of fish, and rising with their prey some feet upright above the water, the floods of blood and water rushing from their mouths, and the clouds of vapour issuing from their wide nostrils, were truly frightful." *

All this is rather foreign to my purpose, but it will not be without interest to those who desire to study the reptile world. I now proceed to—

Order III. SAURIANS (SAURIA).

Are covered with a tough but often flexible dermal envelope in which no bones are embedded, but which has very numerous granular

* 'Travels through North and South Carolina, Georgia, East and West Florida,' &c. By William Bartram. London, 1792.

or squamiform divisions, often so exactly representing true scales as to have led even the most learned naturalists to call them by that name: their legs vary in number, and are four, two, or none; the tongue is also very various in form, and their mode of reproduction is different in different tribes—they agree, however, in having the bones of the head closely united, and in this respect differ from the snakes, in which these bones are separate. We have four members of this order supposed to inhabit Britain, and these belong to two families, called, by Lord Clermont, Lacertinidæ and Scincoideæ. In both instances I cite the characters given by this distinguished naturalist, not having sufficient knowledge of the exotic forms of either family to draw up original diagnoses.

Family LACERTINIDÆ.

"The body is prolonged, with four feet, having four or five claws, all provided with nails; the tail long, conical, often twice as long as the body; the head protected by horny many-sided plates; the belly covered with large scales; the tongue free, extensile, divided into two filaments towards the top; the eyelids are moveable."

Genus, LACERTA.

Of which the characters of the British species are those of the family.

THE GREEN LIZARD (*Lacerta viridis*).

Guernsey Lizard. Jersey Lizard.

Lacerta agilis, β. viridis. *Linneus, Faun. Suec.*, p. 289.

Lacerta viridis, *Dumeril and Bibron*, vol. v., p. 210; *Clermont, Quadrupeds and Reptiles of Europe*, p. 184.

The palate teeth are usually twelve on each side; the tongue is extensile and bifid at the extremity; the nose is rather pointed and the nostrils approximate; the fore feet extend to the nostrils, the hind feet to the commencement of the fore feet, or within a short distance of them; the tail comprises two-thirds of the length of the body; the scutes on the upper part of the neck and beginning of the back are oval and tectiform, becoming by degrees more hexagonal as they approach the tail; the scutes on the sides are oval, with a slight longitudinal elevation along their centres excepting in the three or four rows next to the ventral plates, which are quite flat; in a line drawn over the centre of the back, from one edge of the ventral region

to the other, there are fifty scutes; the central plates are in eight rows, the outer ones being short and composed of small plates. The colour is generally vivid green; but in a specimen for nearly two years in my garden, this colour was mixed with yellow and brown in spots, and the belly and under parts were entirely yellow. The length is fourteen or fifteen inches. Although having had living specimens from Jersey in my possession at different times, I never took the opportunity of describing either of them, and am therefore induced to borrow from Lord Clermont's 'Quadrupeds and Reptiles of Europe' most of the foregoing details.

It now becomes needful to explain what claim this beautiful lizard may possess to a place in the British fauna. It is one thing to enforce the acceptance of conclusions drawn by competent observers *because these observers were competent ones*, and another to repeat their statements *because I know them to have been made in good faith.* The latter course I adopt, feeling that I have no right to call in question the statements however I may hesitate about the conclusions at which the several writers have arrived, and at the same time being perfectly aware that it would be a fatal error to insist on the validity of statements which we have now no means either of checking or of controverting. The first instance I shall cite of a British green lizard is most unfortunately Irish. "*Lacertus viridis:* THE GREEN LIZARD, a colore ita dicitur: vulgari major est. In Italia frequentissi habentur. Inveniuntur etiam in Hibernia. An Lacertus Hibernicus *Mus. Tradescanti.*"—*Ray, Syn.* p. 264. Mr. Thompson, in his 'Natural History of Ireland,' vol. iv. p. 62, makes the following comment on this passage. "Our common lizard being occasionally of a greenish hue may possibly have led to the mistake, as persons have in several instances told me that they knew a green lizard to be native, but this always proved to be the common species." Mr. Thompson, I think, somewhat too hastily pronounces Ray's statement "a mistake": and again, having had great personal experience of Irish lizards, I may state very confidently I have never seen one to which Ray's words would apply, "The Green Lizard, a colore ita dicitur."

My next quotation is legitimately introduced: it was published in that choicest of all choice natural histories, 'White's Selborne.' Here it is: "I remember well to have seen formerly several beautiful green Lacerti on the sunny sand-banks near Farnham, in Surrey, and Ray admits there are such in Ireland."

Here Ray's supposed mistake is revived and republished. My third instance was published in the 'Zoologist' twenty years ago, by as scrupulously honest and truthful a man as it has ever been my lot to meet with in any walk in life, a man universally beloved and respected, Dr. Arnold Bromfield.

"I am told by very competent authority the Green Lizard has been found to be very frequent, and even abundant, at or in the neighbourhood of Herne Bay. I may add that there can be no doubt about the species, and that it is certainly not merely the smaller green lizard of Poole, but identical with the species long known to inhabit Guernsey, as my friend Professor Bell has received a specimen from Herne Bay, but not in time to notice the discovery in the second edition of his 'British Reptiles,' lately published. Mr. Bell supposed L. viridis must be only naturalized in its Kentish locality, but the difference of climate and latitude between Guernsey and Herne Bay is not so great but that we may conceive it very possible this beautiful reptile may be really indigenous to both places. It was only till very recently that the nativity of the edible frog (*Rana esculenta*, L.) was fully ascertained in England, although rumour had placed it long since in our indigenous lists. If I am not mistaken, the Lacerta viridis of Guernsey has been said to have been captured in this country, in which case we have now a similar confirmation of the fact, as in the instance of the Rana esculenta."—*William Arnold Bloomfield, in 'Zoologist,'* p. 2707.

Will my friend Mr. Bell kindly inform the readers of the 'Zoologist' whether the Herne Bay specimen was really Lacerta viridis.

My next quotation is perhaps scarcely so much to the point, but still the character of the writer gives it a claim to serious consideration.

"Seven or eight years ago a schoolfellow of mine at Eton, a native of Guernsey, assured me he had seen lizards in Devonshire precisely similar to the green lizards of his own island, which latter, if I remember right, he had often caught and kept in confinement. Nearly two years since, a learned professor of the University of Edinburgh, mentioned that he had dissected a 'green lizard' brought by a botanical party from the Clova Mountains, of which however the remnants were not to be found, when search was, at my request, made for them."—*John Wolley, in 'Zoologist,'* p. 2707.

We now arrive at positive evidence of the capture of a specimen of the green lizard near Dorking. On Friday evening, the 24th of April,

1863, Mr. J. A. Brewer, the secretary of the Holmesdale Natural History Club, exhibited the lizard at a meeting of that Club, and read the following paper respecting its capture and on the general character of its claim to be regarded as British :—

"The specimen now exhibited was caught by a labouring man on a bank by the side of the road, a little way out of Dorking on the road to Reigate, on Friday, April 3rd, 1863, and brought to me the same evening, when I purchased it for the Museum of the Holmesdale Natural History Club. This species, which is frequent in the islands of Jersey and Guernsey, and also in the South of Europe, has not been previously known to naturalists as an inhabitant of England, and is not included by Professer Bell in his valuable work on the British Reptiles, although he alludes to it as having been supposed to occur both in England and Ireland; but gives it as his opinion that green varieties of a much smaller species, Lacerta agilis, have been mistaken for it. The occurrence of this solitary specimen is not sufficient in itself to establish it as a British species; but on showing it, a few days since, to Mr. John E. Daniel, a well-known naturalist, and who certainly would not have been likely to mistake this beautiful species, he informed me that a few years since he had observed three or four specimens of it on the heath about half a mile south of Wareham, in Dorsetshire, one of which he captured, and is quite certain of its identity with Lacerta viridis, a species which he is well acquainted with, having frequently seen it in Germany, and received specimens from the Channel Islands. The proof, therefore, of its occurrence in England is established; whether indigenous or as a naturalized species, remaining doubtful; but there can be now no reason why it should not be added to the British fauna."—*J. A. Brewer, in the 'Zoologist,'* p. 8639.

Lastly, the Rev. J. G. Wood, in his 'Illustrated Natural History,' says—"I know of one instance where the true Lacerta viridis was captured and killed near Oxford, but I believe that it must have been a wanderer from one of the numerous fern-cases that are to be seen in so many houses."

THE SAND LIZARD (*Lacerta Stirpium*).

Lacerta agilis γ dorso punctis albis duplici serie. *Linneus, Faun. Suec.*, p. 289.

Lacerta agilis. *Bonap. Faun. Ital.* (with a figure); *Bell, British Reptiles*, p. 18 (with a figure).

Lacerta Stirpium, *Dum. et Bib.*, vol. v., p. 196; *Jenyns, Brit. Vert.*, p. 291; *Clermont, Quadrupeds and Reptiles of Europe*, p. 182.

The palate teeth are seven or eight on each side; the tongue is extensile and bifid at the extremity; the nostrils are placed near the outer or inferior margin of the nasal plate, and nearly half-way between the anterior and posterior margin; the nose is blunt. The fore legs scarcely reach to the eyes when stretched forward; the hind legs when stretched forward reach about half-way to the insertion of the fore legs: there are five toes on each foot, all of them furnished with nails; on the fore feet the third and fourth toes are longest and nearly equal in length; the first is generally the shortest, the second and fifth are scarcely longer, and nearly equal; on the hind feet the fourth toe is the longest, the third next, then the second, then the fifth, and the first is the shortest. The body is stout, and the tail is comparatively short, and tapers from the base. The colour of the male is brown, inclining to a more or less vivid green on the sides; the female is brown, without the green tint: in both sexes there is an indication of three slightly darker stripes, and in each of these are longitudinal series of black spots; these spots are of different shapes and sizes; in the lateral darker stripes is a series of somewhat ocellated black spots. Linneus, Professor Bell, and others, describe these spots as having white centres; but although the centres are manifestly paler, I never met with a specimen in which they could be called white. The belly is nearly white, sometimes more or less spotted with black.

Ecdysis takes place piecemeal, and I think only once in the year: during the process the animal looks very ragged.

It feeds on living insects, which it seizes with great rapidity, watching for flies settling in the sunshine. It is capable of long abstinence; some specimens taken by my late friend, Thomas Ingall, lived for a long time in confinement without being once seen to eat, yet they lost nothing in bulk: whether from timidity or not I am unable to say, but they resolutely refused food; exhibited a morose and irritable disposition; and were finally consigned to a bottle of spirits in as good condition as when they were caught.

"The female," says Professor Bell, "lays her eggs, to the number of twelve or fourteen, in hollows in the sand, which she excavates for the purpose, and having covered them carefully with sand she leaves them to be hatched by the solar heat."

It inhabits sandy localities, more particularly at Broadwater near Godalming, and Weybridge in Surrey, and Poole in Dorsetshire, but I am uncertain whether it occurs in Scotland or Ireland.

I believe Mr. Jenyns was the first English author who made out in a satisfactory manner that we had two nearly allied species of Lacerta in Britain: I have given above a reference to his diagnosis. The more familiar species is that which I shall next describe.

THE COMMON LIZARD (*Lacerta agilis*).

Scaly Lizard. Viviparous Lizard.

Lacerta agilis, *Linneus*, *Faun. Suec.*, 289; *Syst. Nat.* i., p. 363, n. 15; *Berkenhout*, *Synopsis*, i., 56; *Sheppard*, *in Linn. Trans.*, vol. vii., p. 49; *Fleming*, *British Animals*, p. 150; *Jenyns*, *Brit. Vert.*, p. 292.

Lacerta vivipara, *Jacquin*, *Nov. Act. Helv.*, i., p. 33 *t.*; *Clermont*, *Quadrupeds and Reptiles of Europe*, p. 183.

Zootoca vivipara, *Wagler*, *Syn. Amph.*, p. 155; *Bell*, *British Reptiles*, 2nd Edition.

Above is one of those instances to which B. D. Walsh, as cited in the 'Entomologist's Annual' for 1869, so touchingly alludes in the following passage:—

"To my mind, the naturalist who rakes out of the dust of old libraries some long-forgotten name, and demands that it shall take the place of a name of universal acceptance, ought to be indicted before the High Court of Science as a public nuisance, and, on conviction, sent to a scientific penitentiary and fed there for the whole remaining term of his scientific life upon a diet of chinch-bugs and formic acid."

Although perfectly aware that the Editor of the Annual would not level his anathema at so humble an individual as myself—perhaps he is ignorant of my existence—yet none the less am I conscious of deserving the rebuke, and will submit to the judgment of the "High Court of Science" whenever it shall be pronounced: I plead guilty to knowing that Linneus designated by the name of Lacerta "agilis" the little lizard I am about to describe: I know it was the α or type of his species "agilis": I also know that both his names—"Lacerta" and "agilis"—were adopted by the great continental naturalists of the day, and later by our own Fleming, Jenyns, and every British

naturalist prior to Bell:—further, that I am aware that Jacquin the Younger made the discovery that the little creature was sometimes viviparous, and that, having made this discovery, he forthwith re-christened the lizard "Lacerta vivipara:" and still further, that Wagler, not considering the name a sufficiently dignified and emphatic record of its performance in parturition, still further altered the name to "Zootoca vivipara." I also know that the name "agilis" was thenceforward dropped altogether, or assigned to some other species: I am the naturalist who "rakes from the dust of old libraries" the name of "Lacerta agilis," and who now hopelessly attempts to restore it as originally applied, for which I anticipate the receipt of abundance of the promised formic acid, which I trust to be able to swallow with resignation.

My valued friend Mr. Bell thinks that the Linnean name of "agilis" should be confined to the Sand Lizard, and that the name of "vivipara," proposed by a school-boy eleven years of age,* should be given to the common lizard of Sweden and Britain. I think otherwise, and my argument would run thus:—

i. There is no doubt that the Lacerta agilis of the 'Fauna Suecica' was a common lizard in Sweden at the date of that invaluable work.

ii. Linneus makes three varieties of Lacerta agilis, or perhaps more rigidly speaking a type and two varieties; these are clearly differentiated, *first* by Linneus, and *subsequently* by Retzius and Müller. The type is Lacerta agilis. Var β is Lacertus viridis, of which Linneus says it is "very rare—I have never seen it." Var. γ has a double series of white spots on the back.

iii. These three varieties appear to me absolutely identical with the three species now described.

α. Agilis = Lacerta agilis, Common Lizard, Scaly Lizard, Viviparous Lizard, &c.

β. Viridis = Lacerta viridis, Green Lizard, Guernsey Lizard.

γ. Lacertus dorso punctis albis duplici serie = Lacerta Stirpium, Sand Lizard, Sandy Lizard.

It is extremely probable that the Green Lizard is introduced into the northern fauna by mistake, especially as Linneus expressly tells us that he has never met with it.

* Such was the age of the precocious child who first, and perhaps who alone, has observed the remarkable character on which the distinctions of this species now rest.

The Common Lizard has no palate teeth; the maxillary teeth are minute and sharp-pointed; the nostrils are situated near the inferior margin of the nasal plate; the nose is rather acute; the tongue is bifid and extensile. The fore legs reach to the eyes or rather beyond them when stretched forward; the hind legs reach two-thirds of the way towards the insertion of the fore legs when stretched forward; there are five toes on each foot, all of them furnished with nails; on the fore feet, the third and fourth toes are longest, then the second and fifth, and the first is the shortest; on the hind feet the fourth toe is much the longest, then the third, second and fifth, and the first is much the shortest. The body is stout, the tail long and slender; it is of nearly the same thickness for the first half of its length, and then gradually tapers to a point: the colour of the back is brown in both sexes, with three longitudinal darker stripes from head to tail—of these the median or dorsal stripe is often obscure, the lateral stripes being more obvious: these stripes are more or less spotted with black.

This is, *par excellence*, the common lizard of Sweden and Northern Europe generally, and of England, Scotland and Ireland. St. Patrick, when he banished snakes, vipers and toads from the sister island, kindly allowed the lizard to remain, either influenced by its engaging manners or in consideration of its extreme insignificance, some of the Irish specimens, as Mr. Bewley informs us, not exceeding an inch in length. Lord Clermont tells us that "it is never found in low or flat countries but frequents mountain districts," a statement from which I am very disinclined to dissent, seeing how much care the noble author has bestowed on his valuable work; but it has been within the scope of my daily observation in the summer and autumn of every year for nearly half a century that this lizard is abundant about London and about Godalming, the only districts in which I have resided many years continuously, and both of which localities in reference to the sea level are decidedly "low." The common lizard exhibits a marked preference for the green sand formation overlying the chalk, and this is the surface soil both in its London and Godalming localities. I have never seen it on the mountains of Wales, Scotland or Ireland, but I am quite ready to admit the very slender value of merely negative evidence, especially as the tourist has not the same opportunities as the resident for making reliable observations.

In describing two animals so similar as our British lizards, it becomes necessary to make the distinctions rather comparative than

positive. The following appear to me the more appreciable differences, none of which can however be regarded as very striking:—*First*, the nose of Stirpium is the more obtuse and rounded, the nose of Agilis the more acute; *secondly*, the legs of Stirpium are the shorter, as also is the tail; *thirdly*, Stirpium is the larger species; *fourthly*, in colour the females are very similar, but the males of Stirpium are much greener than those of Agilis; *fifthly*, I have described Stirpium as having palate teeth—Agilis has none; *sixthly*, the mode of reproduction is different—Stirpium, so far as observed, is oviparous, Agilis is what is termed ovo-viviparous, that is, the eggs are matured in the ovary of the female, but the young are extruded in a living and active state, the rupture of the shell or membrane covering the egg probably taking place, as Mr. Bell has suggested, in the act of parturition: this learned author also remarks that the young when brought forth are capable of running about, and "very shortly afterwards of taking their own food," an expression that seems to imply that in their earlier days they receive some kind of assistance in feeding: this inference may not be intended.

I trust I may be pardoned for writing of the character by which this species is distinguished in a somewhat less decided tone than has been adopted by more authoritative herpetologists. I confess to feeling a doubt as to the value of this character as observed; we want repeated observations of the same kind, and although the theory is beautifully illustrated by Mr. Bell, who represents one species in solitary and apathetic grandeur, and the other surrounded by her little ones as a hen with her chickens, this is scarcely the evidence that satisfies a naturalist. The Age of Romance in Natural History has been succeeded by an Age of Caution, which almost amounts to scepticism; both extremes are perhaps to be avoided, but the latter can scarcely lead us into glaring errors, a result which the former may now and then successfully achieve. Moreover, herpetologists are now so well aware that this physiological character is of such frequent occurrence amongst reptiles, and if employed indiscriminately would associate such dissimilar forms, that instead of employing it as a generic diagnosis it would be far better to note its occurrence when observed, without laying any particular stress on its value. It will not only be found frequent among the Lacertinidæ, the Scincoidæ and the Colubridæ, but it will appear exceptionally in species always regarded as oviparous.

A great deal of discussion has taken place in the daily and weekly papers on the subject of lizards receiving into their stomach as a place of refuge, their young ones when threatened with or fearing injury: the majority of the readers and writers in such journals are not naturalists—they know neither "what to observe" or "how to observe," and consequently their statements and arguments melt into thin air before the cross-examination which the mind of a naturalist is sure to bestow on them: nevertheless, the discussion has not been confined to non-naturalists, and excellent remarks have been made by naturalists—remarks well worthy of being transferred to these pages, but which I cannot readily so transfer on account of their obvious relation to other remarks which fall under the category of *aberrant*. The somewhat dogmatical character of a naturalist's mind has a tendency to pooh-pooh the statements in question; such is my own disposition: I don't know how to believe that a young and tender animal can remain in the strongly digestive stomach of a reptile and receive no injury; neither can I imagine what kind of instinct can teach the young of any animal to seek so dangerous a haven. But I wish my readers to peruse the following statements:—*First*, my late lamented friend, William Christy, jun., found a fine specimen of the common lizard, with two young ones; taking an interest in every thing relating to natural history, he put them into a small pocket vasculum or botany-box to bring home; but when he next opened the vasculum, the young ones had disappeared and the belly of the parent was greatly distended; he concluded she had devoured her own offspring: at night the vasculum was laid on a table, and the lizard was therefore at rest; in the morning the young ones had reappeared, and the mother was as lean as at first. *Secondly*, Mr. Henry Doubleday, of Epping, supplies the following information: a person, whose name is English, a good observer, and one as it were brought up at the feet of a Natural-History Gamaliel, once happened to set his foot on a common lizard in Epping Forest, and while the lizard was thus held down by his foot, he distinctly saw three young ones run out of her mouth; struck by such a phenomenon he killed and opened the old one, and found two other young ones in her stomach, which had been injured when he trod on her. In both these instances the narrators are of that class who do know "what to observe" and "how to observe" it; and the facts, whatever explanation they may admit, are not to be dismissed as the result of imagination or mistaken observation.

I can't find it in my heart to conclude these desultory notes without paying my humble tribute to the philosophic manner in which lizards part with their tails. My friend Mr. Bates tells us that in the Brazils "a slight rap will cause the tails of lizards to snap off, the loss being afterwards partially repaired by a new growth:" and, like a true naturalist, he goes on to philosophise on the matter thus—"The tails of lizards seem to be almost useless appendages to these animals; I used often to amuse myself in the suburbs, while resting in the verandah of our house during the heat of the day, by watching the variegated green, brown and yellow ground-lizards. They would come nimbly forward and commence grubbing with their fore feet and snouts around the roots of herbage, searching for insect larvæ. On the slightest alarm they would scamper off—their tails cocked up in the air as they waddled awkwardly away, evidently an encumbrance to them in their flight." * This throws the required light on the subject: you can scarcely look at one of our lizards without his throwing off the useless encumbrance with which nature has loaded him. I believe I may say a school-boy *never* seizes a lizard by his tail, but the overjoyed creature leaves the useless appendage between his fingers, in which position it will wriggle and twist until the astonished lad is glad to release his useless captive; and dropping it on the ground its violent demonstrations of vitality are again renewed, and are sometimes continued for the space of an hour. The bleeding stump from which the tail has been discarded soon heals over, and before long nature produces a new tail in the place of the old one: this reproductive power is almost as marvellous as the self-mutilating power by which the tail is discarded, and both require that careful investigation which has not yet been given to them. We shall see hereafter that this mutilation has, under certain circumstances, a bearing on that natural instinct, the preservation of life; for those snakes which feed on lizards almost invariably seize their retreating victim by the tail, and no sooner is this abandoned by the rightful owner to its inevitable fate, than the snake makes sure of this "sop thrown to Cerberus," and suffers the tailless lizard to generate a new caudal encumbrance at leisure. The mutilation has sometimes a most curious effect, by which the lizard may be said to be a gainer, for the stump not unfrequently produces two tails instead of one.

EDWARD NEWMAN.

(To be continued.)

---

* 'Naturalist on the Amazon,' vol. i., p. 17.

Rough Notes from the Channel Islands.

By J. A. HARVIE BROWN, Esq.

(Continued from Zool. S. S. 1592).

ON February the 15th my guide—George Vauden—and I started from the inn, with the intention of exploring the wild coast scenery of the island. First visited the Creux de Derrible, a very fine creux indeed, very much finer than the one before described which I saw in Herm. One side of this creux is nearly 300 feet in perpendicular height, but the other is not nearly so high nor so precipitous; it has communication with the sea beneath by two lateral openings, and at high tide, with a rough south-west wind blowing, it must be indeed a grand sight to see the great waves come dashing through these narrow passages. We now passed on along the rocky coast to d'Iscart Bay, a rugged, weather-beaten and picturesque bay, with a beautiful wooded valley opening upon it from the landward side, and a smooth sandy little bit of bathing beach with an arched rock at one side. Then proceeded to the coupée, where the road connecting Sark and Little Sark runs along the top of a narrow ridge, and is only about seven feet in width, with a nearly perpendicular cliff on one side of 300 feet in neight, and on the other side a steeply sloping bank—about 75 degrees—down to the sea. In a high wind such as was blowing on the day I visited it, it was anything but a pleasant sensation passing along this narrow path. The view of the rock scenery of Little Sark as seen from the northern extremity of the coupée is very fine, and in some respects may be said to resemble a certain view of Kynance Cove, at the Lizard in Cornwall. The view from the south end of the coupée, looking northwards, embraces all the line of coast south of the Guliôt caves, takes in the Island of Brehon, which is only separated from Sark by a narrow channel of deep water, and beyond, Herm and its north-east shell beach, and the northern and low lying portion of Guernsey. After exploring one or two "queer places" in the rocks we pushed on towards the famous Guliôt caves, but on arriving found we could not effect an entrance owing to the tides. We did get into the outer cave, but its wonders (Vauden said) were nothing to be compared with the other and inner cave: nevertheless I was sufficiently struck with the forms of marine life which even here completely covered and hid from view every square inch of the sides of the cave. Hundreds and thousands of the curious

brittle acorn barnacles clustered from floor to roof of the cavern, many of them growing to a great size. Specimens which I took away with me and kept alive in sea water were most beautiful creatures when closely examined, as they threw out their little bag-like, net-like feelers, in search of their microscopic food. Another part of this cave was perfectly covered with sea-anemones of every shade of red, brown, green, orange and purple. There were also corallines and sponges, some of the latter yellow, some orange, some red. How I longed to enter the inner cave, to see the tubularias and hairy urchins and seaweeds and fishes of the pools, but it was not to be. The tides would not permit until the 29th of February, and until then we could not stay; and it was with no inconsiderable amount of regret that I turned my face homewards without having seen these wonders of the deep. *Perhaps* another time I may, who knows.

The Boutiques Caverns were well worth visiting, though, curiously enough, scarce any sign of marine life is to be found in them, though apparently quite as well suited for it as the Guliôt caves. These caverns have never been thoroughly explored, and there is one branch cavern that no one has ever been to the end of. At high-tide all these caves are full of water, so that it would be dangerous to venture too far in. Another fine set of caverns are those of Grève de Ville. One of these caves is of great altitude inside, and communicates with the open air above by means of a small round opening through which the sun-light streams in, and illuminates the whole roof and sides of the cave. In course of time, perhaps, the thin crust of earth and rock which covers this great cave will fall in, the debris be washed away by the ever restless sea, and finally another creux be formed upon a grander scale than the Creux de Derrible. I ought not to quit the subject without mentioning the Creux Harbour of Sark. This is a little semicircular bay on the east coast of Sark, hemmed in by high perpendicular cliffs. Across the opening of this bay a pier is now being built which will render it a safe though rather confined harbour. The only communication with the interior of the island from this bay is by means of a long tunnel cut in the cliff, and by a steeply sloping road leading to the centre of the island. The view of this harbour, as seen from the end of the breakwater and pier, is very peculiar, especially as the tunnel being quite straight, affords a view of the quarrying and other work which is going on at the other end. Of the natural history of Sark I had but few opportunities of judging, as I missed seeing the Guliôt caves to advantage.

I am afraid you will find this a somewhat lame account of the beautiful Island of Sark, but were I to enter more into the particulars of its scenery, I fear I should be only repeating what Black's 'Guide Book' has already most amply treated of, and which Prof. Ansted's 'Channel Islands' may be said to have already exhausted.

JOHN A. HARVIE BROWN.

Preservation of Sea Fowl.

(The Introductory Observations are abridged from the 'Field' of March 13th.)

MUCH has been said of late respecting the expediency, or otherwise, of providing by statute for the preservation of sea fowl, and with good reason. Naturalists have observed with regret the wanton and indiscriminate slaughter of birds which has for some time past been taking place on all parts of the coast without any regard to season. Whether the pleasure-seekers, the *plumassiers*, or the leaders of female fashion are the most to blame, we will not here inquire; suffice it to say that the birds are destroyed by hundreds, nay thousands, and principally at a time of year when they have eggs or young in their nests. Were the birds thus taken used as food, there would be some excuse; were they killed at any other time of the year, except in the nesting season, there would not be such ground of complaint. Under the system which at present prevails, the extinction of many beautiful species of sea fowl seems imminent. It becomes a question, then, whether the aid of Parliament should not be invoked to avert an event so undesirable.

But it may be asked of what use are these birds, after all? Supposing they are protected by law during the nesting time, what then? There is a very complete answer. The evidence of mariners, fishermen, agriculturists and naturalists tends abundantly to prove that the various species of gulls deserve protection for many reasons. They are useful to mariners in warning them off rocks, shoals, and other dangers of the sea; acting, in fact, as living fog-signals. They are useful to fishermen in directing them to the most productive fishing grounds. The fishermen always know where there is a shoal of fish by the movements of the gulls, which fly round and round the shoal, now and then swooping to take a fish as it rises to the surface. Were it not for this aid much time would be wasted, with much wear of nets.

Many species of gulls follow the plough, and destroy quantities of grubs and worms, which they snatch from the upturned soil. As scavengers, these birds are most useful in removing various kinds of offal from our shores and harbours. In addition to this, who will not readily admit that the presence of these wild birds on our coast contributes very greatly to the beauty of the scenery.

On all or any of these grounds, they deserve protection. And what is this to amount to? Simply the appointment and observance of a "fence time," as in the case of game and fish. Let them be unmolested for a certain period of the year, to rear their young and perpetuate their species.

In furtherance of these views, the following draft of a Bill has been prepared by Mr. J. E. Harting, and submitted to the House of Commons:—

"Whereas large numbers of sea-fowl are wantonly every year taken and destroyed on the coasts of England and Wales, without any regard to season, whereby the extinction of such sea-fowl is threatened: and whereas the said sea-fowl are of signal service to mariners on the said coasts, in warning them off rocks, shoals and other dangers of the sea; and also to fishermen on the said coasts, in directing them to the most productive fishing-grounds; and the said sea-fowl are also of use for sanitary purposes in removing various kinds of offal from the harbours and shores of sea-port towns; and further, that the said sea-fowl contribute much to the beauty of coast-scenery: and it is therefore expedient to protect such sea-fowl during the breeding season, and to prevent their eggs from being taken or destroyed:

"Be it therefore enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

"1.—This Act may be cited as 'The Sea-Fowl Preservation Act, 1869.'

"2.—The words 'sea-fowl' shall for all the purposes of this Act be deemed to include the different species of gulls, auks, guillemots, cormorants, puffins, terns, skuas, petrels, gannets, divers, razorbills, shearwaters and grebes.

"3.—Any person who shall kill, wound or take any sea-fowl, or use any boat, gun, net or other engine or instrument, for the purpose

of killing, wounding or taking any sea-fowl, or shall have in his control or possession any sea-fowl recently killed, wounded or taken, between the first day of May and the first day of August in any year, shall on conviction of any such offence before a justice or justices of the peace forfeit and pay for every such sea-fowl so killed, wounded or taken, or so in his possession as aforesaid, such sum of money not exceeding twenty shillings as to the said justice or justices shall seem meet, together with the costs of such conviction.

"4.—Any person who shall wilfully take out of the nest or destroy in the nest the eggs or young of any sea-fowl, between the first day of May and the first day of August in any year, shall on conviction thereof before a justice or justices of the peace forfeit and pay for every such egg or young bird so taken or destroyed, such sum of money not exceeding five shillings as to the said justice or justices shall seem meet, together with the costs of such conviction.

"5.—Any person who shall expose or offer for sale any sea-fowl, or the eggs or young of any sea-fowl, between the first day of May and the first day of August in any year, shall on conviction thereof before a justice or justices of the peace forfeit and pay for every such sea-fowl, egg or young bird, so exposed or offered for sale as aforesaid, such sum of money not exceeding five shillings as to the said justice or justices shall seem meet, together with the costs of such conviction, unless it shall be proved to the satisfaction of the said justice or justices that the said sea-fowl, eggs or young birds so exposed or offered for sale as aforesaid have been taken previously to the first day of May or subsequently to the first day of August, or have been taken or received out of England or Wales.

"6.—Where any offence under this Act is committed in or upon any waters forming the boundary between any two counties, districts of quarter sessions, or petty sessions, such offence may be prosecuted before any justice or justices of the peace in either of such counties or districts.

"7.—Any offence committed under this Act on the sea-coast or at sea beyond the ordinary jurisdiction of any justice or justices of the peace, shall be deemed to have been committed within the body of any county abutting on such sea-coast, or adjoining such sea, and may be tried and punished accordingly.

"8.—Any person who shall so offend as aforesaid may be required by any constable, coastguard-officer, gamekeeper, or by any other person holding a license to kill game, to tell his Christian name,

surname, and place of abode, and in case such person, after being so required, shall offend by refusing to tell his real name or place of abode, such person shall, upon being convicted of any such offence before a justice or justices of the peace, forfeit and pay, in addition to any penalties incurred under Sections 3, 4 & 5 of this Act, such sum of money not exceeding twenty shillings as to the convicting justice or justices shall seem meet, together with the costs of such conviction.

" 9.—The penalties incurred under this Act shall in all prosecutions at the instance of any person authorized by Section 6, be paid and applied in manner following, that is to say, one moiety of every such penalty shall go and be paid to the person who shall inform and prosecute for the same, and the other moiety shall be paid and applied in such manner as the said justice or justices may direct.

" 10.—This Act shall come into operation on the first day of May next after the passing hereof.

" 11.—This Act shall not extend to Scotland or Ireland."

On Wednesday, March 10th, an influential meeting was held at the Havover Square Rooms, to consider the Bill now before Parliament for the preservation of sea-fowl during the breeding season.

Mr. Sykes, M.P., who had introduced the Bill, occupied the chair; and amongst those present were the Hon. W. O. Stanley, M.P.; Mr. R. Ward Jackson, M.P.; Mr. Clay, M.P.; Mr. R. Winn, M.P.; Lord Alfred Churchill; Lord Clermont; Vicount Walden, President of the Zoological Society; Mr. C. B. Denison, M.P.; Sir G. Grey, Gen. Buckley, Col. Ainslie, Col. Mountjoy Martyn, Lieut.-Col. Fyers, Lieut.-Col. Hall, Prof A. Newton; P. L. Sclater, F.R.S., Secretary to the Zoological Society; W. H. Flower, F.R.S.; Dr. A. Günther, F.R.S.; Robert Hudson, F.R.S.; Edward Blyth, F.Z.S.; Osbert Salvin, F.L.S., F.Z.S.; J. E. Harting, F.L.S., F.Z.S.; W. H. Huddlestone, F.L.S., F.Z.S.; A. W. Crichton, F.L.S., F.Z.S.; H. E. Dresser, F.Z.S.; G. Cavendish Taylor, F.Z.S.; F. H. Lascelles, F.Z.S.; Dr. Crisp, Dr. Armitage, Edward Alston, J. H. Belfrage, W. M. Wilkinson, Francis Darwin, Henry Lee, Frank Buckland, T. Harland, Rev. H. Barnes, Rev. F. O. Morris, Rev. H. Ward, R. Palmer, J. Dennis, E. Dymond, F. W. Lucas, W. B. Tegetmeier, R. B. Sharpe, and many others.

Letters of apology were read from His Royal Highness Prince

Christian, Lord Tredegar, General Seymour, Dr. Percival Wright, Rev. H. B. Tristram, Mr. F. H. Salvin and Miss Burdett Coutts.

The Chairman, after some prefatory remarks, stated that there were three points on which he especially wished to have the opinion of the meeting. *First*, whether the eggs of sea-fowl ought to be protected as well as the birds; *secondly*, whether any and what provision should be made in cases where the young birds were taken for food; and, *thirdly*, at what dates respectively should the "close-time" commence and end. Before proceeding to discuss these points, however, two resolutions would be submitted to the meeting.

Professor Newton then moved "That this meeting being convinced that the sea-fowl are rapidly decreasing in number on all parts of the coast, owing to the practice of destroying them at all periods of the year, feels persuaded that legislative action is necessary to ensure their preservation."

This resolution was seconded by the Hon. W. O. Stanley, and carried unanimously.

Mr. F. Buckland, seconded by the Rev. F. O. Morris, then moved "That this meeting recognizing the utility of the said sea-fowl, protests against the cruelty of killing them during the breeding time, and pledges itself to support the Bill introduced by Mr. Sykes for their preservation at that season."

This was also carried unanimously.

The three points referred to by the Chairman were then discussed *seriatim*.

Professor Newton considered that with regard to these, there was ground for much difference of opinion. He himself would object to a clause providing for the protection of eggs, as under ordinary circumstances the taking of them conduced but little to the diminution of the number of sea-birds. In parts of the country with which he was acquainted persons farmed out meres for certain rents to others, who were entitled to the eggs laid thereon. It was plain that the owners of these meres would not do anything which would cut off the supply from which they derived their revenue. Certain cases should, of course, be decided according to the character of seasons and localities. He might mention that the eggs of the black-headed gull were frequently sent to London, and sold as plovers' eggs. As regarded killing birds for food, that did not prevail much in England, but in Scotland and the islands near it it would be utterly impossible to try to prevent the people taking these birds for purposes of suste-

nance. The earlier the beginning of the close season was dated from the better.

The Hon. W. O. Stanley, M.P., spoke of the protection against shipwreck sea-birds afforded on the coast, and read a letter in which the testimony of the brethren of Trinity-house, to the same effect, was emphatically given. He felt that permission to take eggs in certain localities would render the proposed Bill inoperative. Perhaps a clause might be inserted in which the cases of taking eggs on inland lakes might be excepted. He thought that the close-season should date from about the 12th of April to the 12th of August. He suggested that in cases where sea-birds were necessary as articles of food, magistrates and sheriffs might be empowered to grant licences for killing them.

Lord Alfred Churchill thought the Act should apply to the coast within one mile of the foreshore.

Mr. Winn, M.P., spoke of the increase in the number of birds which had occurred in North Lincolnshire since the killing of them had been prohibited. He thought that the close-season should begin about the 12th of March and end about the middle of July, when the young birds were quite strong on the wing and able to protect themselves.

In reply to a question from Mr. Cavendish Taylor, the chairman said it was proposed to extend the provisions of the Bill to Ireland.

In reply to a question from Mr. Banting, it was stated that while 100,000 sea-birds per year were killed for mere pleasure, only 12,000 were killed for purposes of trade.

Dr. Crisp said that a gull would destroy a ton of fish in the course of a year. He did not mean that literally, as the fish had not attained their full size, but what a gull consumed in the year represented that amount.

The Rev. F. H. Barnes said that gulls generally caught the fry of whiting. Say that the gulls consumed 2,000,000 or 3,000,000 of these fry in the year, in the same time whitings would destroy 900,000,000 fry of herrings and other fish.

The Hon. W. O. Stanley said that if the sailors of England were polled they would be found to be in favour of sea-birds, on account of the warning of danger their presence often afforded. In the Isle of Man there was a law in force, which possessed very stringent provisions regarding the destruction of these birds.

Dr. Günther was of opinion that the cormorant should be omitted from the list of birds to be protected, on the ground that it is very

destructive to fish,—that it is not sought after for the sake of its plumes like the gulls,—and that from its wariness and great power in diving, it is able to avoid the wholesale destruction to which other birds were subject.

Mr. H. E. Dresser thought that the words "sea-fowl" would be more applicable than "sea-birds" in the Bill as it now stood, inasmuch as the latter term was too comprehensive, it being intended only to protect those birds which are web-footed and swim. For this reason he proposed that the words "sea-fowl" should be substituted, and that the name "oyster catcher" should be struck out.

Mr. J. E. Harting considered it expedient to protect the eggs equally with the birds, since as much destruction of life might be effected by wantonly robbing the nests as by killing the old birds. He thought that a date might be fixed previously to which a sufficient number of eggs might be taken, for food or otherwise, without a penalty, and subsequently to which, under a penalty for taking them, there would still be time for a second or third brood to be reared. He objected to the proviso which had been introduced in the second section of the Bill as it now stood, which was to the effect that no penalty should attach for killing the birds *bonâ fide* for the purpose of food, because he considered that such a proviso would render the section inoperative. Every person who killed a gull in the breeding season would say that he intended to eat it, and the Act would be evaded at every turn. He observed that none of the previous speakers appeared to have considered the practical working of the Act, which was of more importance than many supposed.

Mr. Harland submitted that the speaker was out of order in referring to a question which had not been mentioned by the Chairman, and thought there was no necessity for bringing it before the meeting.

Professor Newton could not agree with Mr. Harland. He considered that the practical working of the Act was most important, and that it would be extremely vexatious to find, after passing the Act, that there was any difficulty in carrying it into effect.

Mr. Harting then proceeded to point out the legal effect of certain words in several sections of the Bill as it now stood, and proposed certain amendments.

An animated discussion then followed, in which Mr. Francis Darwin, Mr. Jackson Gillbanks and others took part.

Mr. Blyth considered it unnecessary to extend the Act to such species as breed inland, as for instance the black-headed gull. He

thought that this species would be sufficiently protected by the owners of the soil on which it is found nesting, and that as the eggs taken for food are almost invariably those of the black-headed gull, he believed that if these were excepted in the Act, there would be no objection to protecting the others.

The following resolutions were then put to the Meeting, and carried:—

1.—That the Bill should contain a clause for the protection of the eggs.

2.—That a proviso should be inserted to the effect, that no penalty should attach for taking birds unable to fly *bonâ fide* for the purpose of food.

3.—That the close-time should commence on the first of April and expire on the first of August.

A vote of thanks to the Chairman then terminated the proceedings.

Notes on the Great Auk.

By J. H. GURNEY, jun., Esq., F.Z.S.

OF the great auks alluded to in my previous paper (Zool. SS. 1442) the Cork specimen and the one found dead at Lundy Island are not accounted for; probably neither were fit to stuff; nevertheless, it is much to be regretted they were not kept for the sake of the skeletons. The remainder are in collections; according to Yarrell, more than two occurred at St. Kilda; at any rate there is no known *English* specimen of the great auk existing,—although, of course, there is not the least reason why the Durham specimen that the Rev. J. Gisborne bought for £8 should not be English-killed, or the bird that belonged to the old Wycliffe Museum (which is a young one changing into winter plumage), now at Newcastle. The latter, in all likelihood, is English: according to Latham, the young great auks used not unfrequently to be blown ashore. This bird Mr. Hancock re-stuffed two or three years ago; from it, and from Mr. Hancock's own beautiful specimen, every bone has been extracted: on placing the two skulls side by side, it is observable that the orbit is completely formed in the adult, while in the young one the socket is imperfect. Mr. Hancock was good enough to point out to me how this held good in the razorbill. I have been favoured with a photograph of this very old specimen, mentioned both by Donovan and Latham. I may here

remark that the cut in Bewick's book was (as I learn from Mr. Hancock) principally taken from Edward's figure.

As every one knows, the great auk, the penguin of our northern seas, had no powers of flight, on account of the modification of the extremities *only* of its wings. While its humerus, says Prof. Newton, is in proportion with the bulk of the body, and fully twice the length that it is in the razorbill, the ulna, radius and metacarpus are nearly the same length in both species, only much thickened in the gare fowl (Ibis, Oct. 1861). Until Messrs. Newton and Wolley searched the "kitchen middins," and Mr. Hancock extracted two skulls, the want of great auk bones had been greatly felt; but an almost perfect exampleof the great auk, in a mummy state and destitute of feathers, was a few years ago found by the Bishop of Newfoundland while on a missionary cruize, at Funk Island, and forwarded to the British Museum by the President of the Nova Scotia Institute of Natural Science; and more recently bones have been found in Caithness.

It does not come within the scope of this little paper to say much about the osteology of the Alcadæ, but it may be worth mentioning that I have a number of razorbill breastbones, which differ from the great auk's in this respect, that there is a notch in the hind margin on either side the keel.

Mr. Proctor has handed me a photograph of the specimen in the Durham Museum; it rests upon its tarsus: Mr. Proctor says that when he re-stuffed it, he found the skin peel off, showing it must have been high when skinned. I observed that the bill was varnished over, so that the nostril had become invisible. The white eye-spot is neither so large nor so conspicuous as in Mr. Hancock's bird; however, the specimen is in excellent preservation, and Mr. Proctor has it under a separate shade, whereas the York one was, until lately, thrust in with a lot of other Alcadæ, forming part of the Rudston Read collection. This York specimen once belonged to the keeper of the Surrey Zoological Gardens, who sold it to Mr. Allis, who sold it to Mr. J. Bell, M.P., whose nephew gave it to the Museum. Mr. Daniel Graham, the well-known taxidermist, has given me its photograph: the white eye-spots, likened by Clusius to a pair of spectacles, show as pure as possible, and the orbit is not included in this white space, as seems to be the case with the Papa Westra specimen preserved in the British Museum. The two mandibles of the bill do not fit into one another, apparently because they have been tied with a string, the mark of which is visible.

At the demise of Mr. Arthur Strickland, the great auk formerly in that naturalist's collection passed with his other birds to the Museum at York; consequently this Museum can now boast of two great auks. The new comer is an adult in summer plumage. When it came to be cleaned it was found that there was no stuffing in it, and that the body was simply kept in position by wires. Both the York birds are in excellent preservation.

Of about seventy specimens of the great auk, which I am informed exist in this country, in public and private collections, I cannot ascertain that one is in winter plumage (the nearest approach being the one at Dublin); and I have not seen it so represented in any picture except Lewin's and Donovan's, the latter of whom drew from the specimen which formerly stood in the Leverian Museum, which consequently must have been killed in the winter time, and can no longer be in existence.

I venture to offer the following description of the great auk's winter plumage (giving my authority):—The large patch of white between the bill and eye, mottled with blackish feathers (Dr. Burkitt's specimen, a photograph of which has been sent me by Mr. Newton, and Dr. Charlton's statement that according to Benicke, a writer in Oken's 'Isis' for 1824, the eye-spot becomes in winter of a dark brown, interspersed with a few white feathers); chin, throat and front of neck white (Dr. Fleming's specimen). It appears to have undergone much the same change as the guillemot and razorbill; and the feathers in a fresh-killed specimen must have been soft, even and glossy.

Olaus Wormius' bird, to be mentioned afterwards, was a young one, "for it had not arrived to that bigness as to exceed a common goose" (Musci, lib. iii. cap. 19); and I may here remark, that all writers on the great auk have a marvellous knack of comparing it to a goose, which it resembled in nothing except its stupidity.

The bill of the great auk is thick and truncated, and it is marked with several lateral furrows: now the furrows in the kindred species, A. torda, are white, and I fancy many naturalists have an idea they should be white in A. impennis. I thought so until I read a passage in Willughby saying that the penguin's (A. impennis) differs from the auk's (A. torda) bill in that it hath no white lines. Ray likewise says in the 'Synopsis Avium,'—"Nullæ autem in rostro lineæ albæ sunt, quemadmodum in alka." On the other hand, what Ray and Willughby say is quite upset by the fact, that the two auks in the York

Museum *have* the ribs upon the bill white, and Mr. Graham, who has handled both, is confident they have not been painted.

The description in 'Willughby's Ornithology' (published 1676) was taken from a dried specimen in the Repository of the Royal Society, but the figure is apparently copied from Wormius, and is extremely interesting as being the earliest picture we have, and also because it was taken from a living bird* brought from the Ferroe Islands; and that being so, the error of the white ring round the neck (which has been repeatedly remarked on) is very strange. Perhaps, after all, it is intended for a collar such as Chinese cormorants have.

Sir Thos. Brown and other contemporaries of Ray and Willughby, make no allusion to the great auk; and it is worthy of remark that it is omitted in Ray's 'Catalogue of English Birds' (compiled from the labours of Willughby), so there is nothing to show that Willughby considered the great auk British.

It is curious to speculate on the habits and economy of an extinct bird. For ten months out of the twelve the great auk, since it could not fly, must have been on the sea; it is scarcely conceivable that for ten months this bird should never have been out of the water a minute.

According to Selby and Latham, the great auk was particularly fond of the ugly lump-fish and father-lasher, and the young were said to eat rose-root (Rhodiola rosea). The father-lasher, as I am informed by Mr. Hancock, is a fish that keeps at the bottom of the sea, and only a good diver like the great auk could feed on it.

The great auk is always accredited with having possessed rapidity and astonishing velocity under water, but its feet have not the beautiful mechanism that belongs to the great northern diver (Yarrell, Brit. Birds iii. 334), and it is improbable that it surpassed that bird in the distance it could dive. The old ones are reported to have been very rarely seen on shore, though the young ones used not unfrequently to be met with; just as we see twenty blackbilled auks for one adult razorbill. According to Latham the skin between the jaws was blown into a bladder, and used for the darts of the Greenlanders, but I confess I do not see how this could have been done, and am very doubtful of the great auk's existence at any time in those icy

* The fact that it is drawn resting upon the length of the tarsus is a sufficient proof that the picture is from life.

regions. The Esquimaux are said to have used the skin for garments, and Mr. Harrison Penney, of Darlington, has articles of apparel made from the skin and feathers of the rock-breeding sea-fowl, given him by the Moravian Missionaries, who, by the bye, on the authority of Dr. Charlton, were once guilty of eating a great auk by mistake for a wild goose.

The great auk has given rise to many tales and stories. One day Mr. Hancock received a visit from the Edinburgh birdstuffer, Mr. Small, who, on being shown a tray of auks' eggs and plaster casts, stated that he had recently seen a sailor offering one for £3; the sailor had been told it was valuable, when at Liverpool: he was carrying it in his jacket pocket upon a string, like an ostrich's egg. On hearing this, the late Mr. Wolley, who chanced to be in Newcastle, without loss of time started in chase, and dogged the sailor with indefatigable perseverance, coming up with him just too late, for the man was drunk, and the egg lost or broken.

Mr. Hancock's is, I believe, the only egg blown with a single hole, from which we may infer it was one of the very last taken. The Rev. H. B. Tristram has one of the last, taken at Gier-fugle shier, south of Iceland, in 1834. Most of the eggs existing in collections have been imitated in plaster at one time or another. The best casts are those by Mr. Hancock, who can produce a drawer full to all appearance of veritable great auk's eggs,—in reality they are all shams but one,—but the resemblance is so perfect that, without touching, it is almost impossible to say which is the real egg. It took Mr. H. sixteen days to colour his plaster imitation of the late Earl Derby's egg, which was so foul when he received it that it had to be washed.

The great auk is such a valuable bird that a history is attached to almost every specimen, real or sham. Mr. Masters, of Norwich, possesses an imitation great auk, which I am told is very good: it was made by his servant, Samuel Bligh, and the bill is of wood. Mr. Proctor, of the Durham University Museum, has also manufactured a great auk quite recently. The black parts are Brunnich's guillemot, and the breast is a northern diver's; and this fictitious bird, now in my possession, contains a few feathers of the real great auk in the region of the neck.

J. H. GURNEY, Jun.

Bank, Darlington.

Slaughter of Sea-fowl at Weston-super-Mare.—During the winter Weston Bay is frequented by large flocks of gulls, which are attracted by the shoals of sprats then to be found in its shallow waters. The kittiwake is by far the most numerous of the gull tribes which then put in their claim to a share in the fish harvest. But this last winter the gulls themselves have been more than usually persecuted: they came to capture, and have themselves been taken. There are always a few desultory shooters on the watch for them; but this season the campaign against them was methodically organized. Our fishermen found that, in consequence of the great demand for gulls' wings for ladies' hats, it would be quite as profitable for them to shoot the birds as to attend to their nets. The gulls were tempted within gun-shot by broken sprats being thrown overboard, and when one was killed it was allowed to float upon the water to attract the curiosity of its companions and to draw them within range. This method of shooting appears to have been a very successful one, as I have been told of gunners bringing back forty or fifty gulls each after a morning's work, and I have myself met the men returning more than once with large panniers laden with dead gulls. One of the fishermen told me that he had noticed several minute gulls in company with the others: he brought me one which he had shot, and this is a very pretty specimen of the little gull in a state of plumage which very closely resembles that of the "tarrock," or young kittiwake, with the black patch on either side the neck behind the ear, and the black upper wing-coverts, which are the well-known characteristics of the tarrock. Another boatman shot an old fulmar, not a common visitor to our southern coasts. I am very glad to see there is some chance of the gulls and other cliff-birds obtaining protection during the breeding-season, for with the present rage for feathers of all description, there seemed a prospect that every handsome bird which could be obtained by powder and shot was doomed to extermination. No lover of Nature would care to miss the gull from the shore, and missed he will be if something is not soon done to protect him. I am told that here in Weston a great number of gulls were sold and eaten, the price obtained being about twopence for each bird.—*M. A. Mathew; Weston-super-Mare, February* 23, 1869.

American Robin.—Some readers of the 'Zoologist' may not perhaps be aware that the American robin is a thrush (*Turdus migratorius*), which will account for the use of mud in its nest, as related in the interesting anecdote in the March number (S. S. 1604). This bird receives all the attention and kindness, and immunity from destruction, in America, that our redbreast does in England: and Nuttall tells us that the "babes in the wood" legend has extended to the American robin. It has the throat and the upper part of the chest black, with the rest of the under parts rufous. Is the tameness and domestic character of the American robin due to the name which some early settler from England gave it? or is it by nature confiding and fond of the society of man, thus earning for itself the name which an emigrant Englishman would always hold dear? Wilson tells us that schoolboys hold the nest of the "robin" in America more sacred than that of other birds. Neither his "red breast" nor his confiding habits, however, prevent his being shot in the winter and sold in the public markets for food.—*C. R. Bree; March* 8, 1869.

Pugnacity of the Wren.—The pugnacity of the wren is well known to all who observe the habits of birds; but I wish to record an instance which recently came under my notice here. Accompanied by my wife and brother, I was walking past an ivy-clad rock, when our attention was attracted by a rustling among the leaves, and

in a few moments down came the objects which were causing the disturbance, in the shape of two wrens closed in desperate conflict. They continued the combat at our feet, and we managed to capture one of them under a hat, the other making its escape to the top of the rock, and immediately giving out its vigorous notes of defiance. On our prisoner being released he forthwith returned the challenge in notes equally loud; and in less than a minute the two had again closed, and again came to the ground struggling together. A second time one of them was caught under the hat, but it got away, and lost no time in answering the note of battle already sounded by its antagonist. The contest was resumed for the third time, and with the same result, the two falling to the ground together as before. We attempted another capture, but failed. Whether the defiant notes which were again sent forth ended in a fourth battle we did not stop to ascertain. We noticed that in closing they grasped each other's feet and fought with their beaks.—*James Murton; Silverdale, Lancaster, March* 17, 1869.

Purple Sandpiper at Weston-super-Mare.—On the 21st of January last I shot a purple sandpiper near Weston-super-Mare: it was a female specimen, and was not in company with any other bird. As this species is not frequently met with on this coast it may be worth while to notice this instance of its occurrence.—*M. S. C. Rickards; Clifton, February* 25, 1869.

White Woodcock.—A buff-coloured woodcock, shot by Mr. Robert B. Templer, in Galway, is mentioned in your March number (S. S. 1602). I have an old oil-painting of a woodcock as nearly *pure white* as possible: the artist has depicted two sides of the bird, and there is hardly a coloured feather upon it. The picture bears the following inscription:—"This very remarkable woodcock was shot by the Earl of Gainsbro', Nov. 7, 1748, and painted from the bird itself, by S. Goodwin, of Oakham." From the handsome frame assigned to the production, and the trouble taken to give a double representation, this appears to have been thought a very great wonder at that time of day.—*Geo. Dawson Rowley; 5, Peel Terrace, Brighton, March* 3, 1869.

The Skins of Alca impennis.—I have read in the 'Zoologist' for March (S. S. 1603) the letter of Mr. J. H. Gurney, jun., on the four skins of Alca impennis: one of these, that belonging to Mr. Frank, is now on its road to join a female already in my collection; but as I have received the invoice, dated Rotterdam, February 13, and as yet no signs of the bird, I conclude that it has either taken to its natural element again, or else that the Custom-house officers have turned ornithologists. Mr. Gurney speaks of one "in full summer plumage"; would that he could tell us of a specimen "in full *winter* plumage"—he would be a great benefactor to my work 'The Alciana,' I having searched many places in Europe in vain. The downy state would be still more desirable, but this is now lost for ever—one of the good things gone never to return.—*Id.; March* 1, 1869. [See *ante*, p. 1641.]

Bewick's Swan at Flamborough.—I have, in the flesh, a Bewick's swan shot on a pond at Flamborough, by Mr. Johnson Dove. It is pure white, except that the forehead is marked with rust-colour. I believe that the merit of the first discovery of this species was actually due to my friend Mr. Hancock, although Richard Rutledge Wingate "tulit honores" (of Selby's 'British Ornithology,' ii. 284).—*J. H. Gurney, jun.; The Bank, Darlington, February* 26, 1869.

Kittiwake Gulls on the Thames.—Cooper, the birdstuffer, of Radnor Street, St. Luke's, showed me to-day a kittiwake gull, which had been shot with another, about the middle of last month, on Chertsey Common. The bird was in the change from

winter to summer plumage: the bluish gray markings behind the eyes had not entirely disappeared, although the head was nearly white. He had received a specimen shot at Putney, and also one from Datchet, shot by Reeve, the fisherman (this bird was in immature plumage). Is it not remarkable that so many specimens of the kittiwake, a purely ocean-feeding gull, should have strayed so far inland as they appear to have done this year?—*A. H. Smee; March* 12, 1869.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

March 1, 1869.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Royal Society,' No. 108; presented by the Society. 'Bullettino della Società Entomologica Italiana,' Anno primo, Fascicoli I.; by the Society. 'Coleopterologische Hefte,' Part iv.; by the Editor, Baron E. von Harold. 'Bidrag til Kundskab om Christianiafjordens Fauna,' af Dr. Michael Sars; by the Author. 'The Zoologist,' for March; by the Editor. 'The Entomologist's Monthly Magazine,' for March; by the Editors.

Election of Member.

Charles Horne, Esq., of 3, Bernard Villas, Upper Norwood, was ballotted for, and elected a Member.

Exhibitions, &c.

Mr. Bond exhibited specimens of Heliothis armiger from the Isle of Wight, Java and Australia. The insect had been taken in Java by Dr. Horsfield; the Australian specimens were captured by Dr. Madden.

Mr. W. C. Boyd exhibited dwarfs of Vanessa Urticæ, Smerinthus Populi, Saturnia Carpini and Pygæra Bucephala, all bred in 1868, by Mr. Davis, of Waltham Cross, and scarcely more than half the ordinary size of the species: this was attributed to rapidity of development, owing to the heat of the summer.

Dr. Wallace exhibited a number of Bombyx Yamamai and their cocoons: during last season he bred about fifty of them at Colchester, and found them to vary considerably in colour: the moth was in the habit of performing summersaults and manœuvres, like those of Cilix or Limacodes when netted. Also Bombyx Pernyi, another oak-feeding species from China, of which he had received through the Foreign Office a number of cocoons, from which the moths were hatching, and one had laid about 270 eggs: he hoped to make some useful experiments with this species, which like Bombyx Cynthia was double-brooded, but would probably be found to require a dry climate and warm soil. Also English-bred specimens of the American Saturnia Cecropia. Dr. Wallace made some remarks on the progress of sericiculture in this country and the colonies: what was principally required was an experiment on a large scale to test the commercial value of the product: with this view a gentleman in Paris desired to purchase 500 lbs. of cocoons, for which he was willing to give 25*d.* per lb.

Dr. Wallace also exhibited a moth which, on the 18th of January, 1869, he observed on the window of his room; but, under the impression that it was a small female of the common Emperor moth, left it undisturbed. On the 19th he noticed that the antennæ were pectinate, and thinking it still to be a female Saturnia Carpini with the antennæ of a male, he killed it and set it out. Closer examination showed that it was not an Emperor moth at all, and he at length bethought him of a parcel of cocoons, which he had received in 1867 from Dr. Hooker, of a Chinese Bombyx which was said to yield the "gut" of fishermen. (See Proc. Ent. Soc. 1867, p. civ.). On looking at the cocoons, none of which were productive during 1868, it was found one of them had hatched, and there was unmistakable evidence of the recent emergence of a moth from the pupa: he had no doubt the moth exhibited was the produce of that pupa. Mr. F. Moore recognized the species as Saturnia Pyretorum (Westw. Cab. Orient. Ent. p. 49, pl. 24, fig. 2).

Dr. Wallace mentioned that he had availed himself of the sample or pattern post for the transmission of boxes of silk-worms or their eggs: so long as there was an aperture at each end of the box, which apertures might be covered with perforated zinc or other material, but left it ascertainable that there was no letter enclosed, no objection was raised by the Post-Office authorities; and he had lately sent a box by post to Japan for eggs at a cost of 4*s.*, which when it last came thence as a parcel had cost 47*s.* Mr. Horne added that bird-skins were now frequently sent from India by sample post.

Mr. M'Lachlan exhibited three male specimens of Dilar Hornei (Ent. Mo. Mag. v. 239), a new species from India of a genus remarkable amongst the Neuroptera for the possession of pectinate antennæ.

Mr. Horne, by whom the species was brought to this country, said the insect was not uncommon in North-West India, on the hill sides, amongst grass in damp places, but not near water: the female had a long yellow-brown ovipositor shaped like a scimitar, which, so far from looking flexible, had the appearance of being very stiff.

Mr. Horne exhibited sheets of the inner portion of the bark of Pinus longifolia, which he had found useful in India as a substitute for cork: it was tolerably soft, and the resin was not injurious to insects.

Prof. Westwood mentioned that in the previous month he had seen exhibited at Oxford a full-grown larva of Lampyris noctiluca, which was distinctly luminous.

Mr. J. J. Weir exhibited a mass of larvæ of Tipula from Blackheath, where acres of land were so infested that there seemed to be more larvæ than earth. In Greenwich Park the grass was, at this early period, almost destroyed by them. Rooks, starlings and sparrows appeared to be busy in the neighbourhood, but no diminution in the number of the grubs was observable.

Mr. Bond mentioned that he had once known four hundred of these larvæ taken out of the crop of a pheasant.

Papers read.

Mr. Charles O. Waterhouse read a paper "On a new Genus and some new Species of Coleoptera belonging to the Family Lucanidæ."

Mr. J. Jenner Weir read a paper "On Insects and Insectivorous Birds, and particularly on the Relation between the Colour and the Edibility of the Larvæ of Lepidoptera."

Mr. A. G. Butler read a paper "On some Caterpillars which are unpalatable to their Enemies."

Mr. Weir's experiments were suggested by the remarks of Mr. Alfred R. Wallace, reported in Proc. Ent. Soc. 1867, p. lxxx.: the conclusions at which he arrived were, that, as a rule, hairy and spinous larvæ were rejected by birds (unless the cuckoo were an exception); but he doubted whether the mechanical difficulty of swallowing them was the cause of their rejection, and rather thought that the hairs were the concomitant of a disagreeable quality of which they acted as an indicator; that bright and gaily-coloured larvæ were, as a rule, refused; but that smooth larvæ of a greenish or dull brown colour, such as are for the most part nocturnal in their habits, and those which simulate the leaves or twigs of trees upon which they live, were eaten with avidity.

Mr. Butler's observations were on the consumption or rejection of larvæ by lizards, frogs and spiders; both lizards and frogs would eat hairy larvæ; and even the stings of bees had no deterrent effect upon a lizard.

These two papers led to a prolonged conversation, in which the President, Mr. Horne, Mr. A. R. Wallace, Mr. Butler, Mr. M'Lachlan and Dr. Wallace, took part.

Mr. Horne said that in India lizards were almost omnivorous, and ate bees with avidity; a friend of his, Colonel Ramsay, had hives of Aphis dorsata placed near some stone walls or terraces, which were a favourite resort of lizards; they would come to the mouths of the hives, lie in wait for the bees, and take them, sting and all. Larvæ of all sorts, smooth or hairy, dull or bright, were eaten by lizards; but scorpions were rejected; bears, however, would eat scorpions, and he had seen bears turn over stones in search of scorpions, and eat them regardless of their stings. He had noticed that a common Indian species of Carabus, and all the blister-beetles, seemed to be free from attacks of any animal.

Dr. Wallace said that the larvæ of Bombyx Cynthia, which were both gaily coloured and covered with tubercles, were eaten by cuckoos, robins and tomtits: the two latter made holes in the skin and took out the inside, whilst the cuckoos swallowed the larvæ whole.

Mr. Alfred R. Wallace was pleased to find that the observations of Mr. Weir went so far to support the theory which, reasoning entirely from the analogy of what had been observed in the Heliconiidæ, he had ventured to suggest in answer to a question of Mr. Darwin's. He thought there was now a solid foundation of fact for the hypothesis that the bright colour of larvæ was protective, and was (as it were) a flag hung out to warn off their enemies. Doubtless every detail either of form or colour had its object and bearing upon the history of the creature. It was not necessary that the law should be absolute or the rule universal; he did not expect to find, on the contrary he should have been surprised if it had been found, that *all* brightly coloured larvæ were peculiarly protected, or that the bright colour of any particular larva protected it from *all* enemies; if it thereby obtained protection from a single enemy, if it was left exposed to the attack of but one enemy less than its neighbours, to that extent at least the colour gave it an advantage; the theory of protective warning supplied the reason for, and afforded a rational explanation of, the gay colouring, which in the case of larvæ could not be accounted for by sexual selection.—*J. W. D.*

Collected Observations on British Reptiles.

By EDWARD NEWMAN.

(Continued from S. S. 1629.)

Order III. SAURIANS (SAURIA) *continued.*

Family SCINCOIDEÆ.

"The head is covered by horny, thin angular plates, with distinct regular sutures; the neck of the same thickness with the breast; the rest of the body and the limbs everywhere are clothed with imbricated scutes, generally having their free margins slightly rounded and arranged in the form of a quicunx; back rounded, without crests or spines: belly cylindrical; no furrow along the sides; tongue free, not generally notched at the tip, covered with papillæ in whole or in part."—*Clermont.*

THE BLIND-WORM or SLOW-WORM (*Anguis fragilis*).

Has no palate teeth; the maxillary teeth are rather long and very slender, sharp-pointed, and slightly bent backwards towards the throat; the tongue is rather fleshy, as compared with that of true lizards it is slightly notched at the tip: the nostrils are lateral and the eyelids imbricated with scutes; the ears are simple apertures, and even these are almost entirely concealed by the imbricated scutes. The body is slightly tetragonal, but unless examined with the express purpose of observing this, appears uniformly cylindrical; the nose is obtuse; the bones of the head are solid and united, and though the swallow is very small, the neck exhibits scarcely any restriction; there are no legs, but aborted leg-bones are to be found beneath the scutes; the body very gradually decreases in size to the extremity, which is blunt; there is no apparent division between body and tail. The colour is grayish brown with a slightly silvery iridescence; there is a narrow dark brown medio-dorsal stripe commencing on the forehead and continued to the caudal extremity; the sides are generally darker than the back, and the belly is bluish black with paler reticulations: the length is generally rather less than a foot. The young are produced alive, and usually six or eight at a birth. The food consists principally, if not entirely, of the small garden slug (*Limax agrestis*), and the larvæ of Lepidoptera. This animal becomes perfectly reconciled to captivity in a few days, and will readily take a small slug if offered it even on the day after being captured: the slug

should be presented to the creature crawling on a little stick or twig, and the bright eye of the so-called *blind*-worm seems at once to sparkle with pleasure; but there is no rapid motion—indeed there is no need for haste—in seizing the victim as in the case of lizards feeding on flies: on the contrary, the head is raised above the slug by an almost imperceptible movement quite in accordance with the deliberate gliding progress of the slug; and when the head is directly above what we might call the loins of the slug, the mouth is slowly opened and the slug bitten just in the manner that a dog bites a rat.

The skin—and I speak from oft-repeated observation—is shed piecemeal, and generally once in the year: Mr. Bell, I see, makes a different statement, viz., that it comes off in one piece in the same manner as that of Ophidians: this I have never seen.

When handled the blind-worm becomes excessively rigid, and the body and tail will separate rather than the creature will allow itself to be unbent: like the lizards, it has the power of partially reproducing the lost tail.

Order IV. SNAKES (*Ophidia*).

Have a long and flexible body without legs, and closely covered with scutes or divisions: the bones of the head are separate, and so loosely arranged as to admit of an almost indefinite expansion of the jaws; hence the possible truth of some of the marvellous accounts of boas swallowing animals apparently larger than themselves. A Cyclopedia of high reputation now before me, says that "some of the species attain a very large size, measuring thirty or forty feet in length, and when they are of that size they can master deer or even buffaloes." A celebrated traveller tells a story of a boa having swallowed a horse as large as a London dray-horse. We also read of an enormous snake in Africa arresting the progress of a Roman army, and this event is narrated in a manner that has no *primâ facie* evidence of exaggeration. All I can say of such accounts is that the skins in our museums and the admeasurements actually made do not convey to my mind any idea of such enormous bulk. The ribs are slender and very numerous; and, from repeated observation, they appear to me the principal organs of progression: by watching the common snake as it moves slowly about its place of confinement, the ribs are seen to move in succession like the legs of a centipede. Most authors seem to consider the ventral scutes as the principal means of progression; but in this I am not disposed to agree, since the feeling, when a tame snake

crawls over my hands, indicates a movement of the ribs and not of the scutes: snakes have neither external ears nor eyelids. We have in Britain three species belonging to two families.

Family COLUBRIDÆ.

Have no poison-fangs either grooved or tubular: they are consequently innocuous.

THE COMMON SNAKE (*Coluber Natrix.*)

Ringed Snake; Grass Snake; Frog Snake.

Coluber Natrix, *Schinz*, vol. ii., p. 38; *Clermont*, *Quadrupeds and Reptiles of Europe*, p. 220.

Natrix torquata, *Bell*, *Reptiles*, p. 49.

The teeth are sharp-pointed and slant backwards, thus rendering the escape of an animal that has been seized extremely difficult: the gape extends to the back of the head, the tongue is divided to a third of its length, the two divisions being sharp-pointed; the head is wide behind and flattened on the crown; the neck is restricted, and the division between head and body is thus distinctly marked; the body is very long, and very gradually tapering to the extremity of the tail, which is slender; the scutes on the back have a distinct longitudinal keel: the ventral scutes are about one hundred and seventy, the caudal ones fifty-five to sixty-five pairs.

Snakes vary greatly in size, but I think chiefly in accordance with age and sex. The female, which is usually much larger than the male, sometimes—although rarely—attaining a length of four feet; the male, when full grown, measures above two feet and a half in length.

The favorite food of snakes is the common frog, which is pursued with an activity and certainty of success that is almost painful to contemplate. The frog seems perfectly aware of the first approach of the snake, and leaps with great vigour to the right and left, uttering at the same time a most piteous squeal or squeak: by degrees the spasmodic leaps become shorter and shorter, and at last the victim abandons itself helplessly and hopelessly to its impending fate. I have often, when a school-boy, produced every demonstration of this abject terror by wriggling a long stick through the uncut grass. Mr. Bell says, the manner in which the snake takes its prey is very curious. "If it be a frog it generally seizes it by the hinder leg, because it is generally taken in pursuit. As soon as this takes place, the frog, in most

instances, ceases to make any struggle or attempt to escape. The whole body and the legs are stretched out as it were convulsively, and the snake gradually draws in, first, the leg he had seized, and afterwards the rest of the animal, portion after portion, by means of the peculiar mechanism of the jaws so admirably adapted for this purpose. * * * When a frog is in the process of being swallowed in this manner, as soon as the snake's jaws have reached the body, the other hinder leg becomes turned forwards; and as the body gradually disappears, the three legs and the head are seen standing forwards out of the snake's mouth in a very singular manner."* (Bell's 'British Reptiles,' p. 51; Second Edition.)

This statement agrees very well with my own observations; but perhaps as I have had frequent opportunities of watching this rather cruel process, I may make a trifling addition from my own experience. I have always seen the frog seized, as Mr. Bell describes, by the hind leg, but I have generally seen the position changed before the act of swallowing actually commenced; the head going down the throat first: I have never seen it standing out of the mouth after any portion of the body had been swallowed.

The taste for frogs leads the snake to frequent those damp situations in the neighbourhood of water where frogs abound; it takes to the water without the slightest hesitation, and swims with remarkable ease, celerity and grace—the head being held clear of the water, as in fanciful representations of sea-serpents. Snakes are very common in such situations in England, but less so in Scotland, and are totally unknown in Ireland.

Snakes are truly oviparous, the female laying from five to fifteen eggs, which are of a bluish white colour and adhere together in a mass: they are generally deposited in an excavation on some damp bank facing the south, and are hatched by atmospheric influence; the egg-shells are tough and of a substance rather resembling leather than the brittle calcareous matter of which the egg-shells of birds is composed. It has been a hypothesis universally received that snakes, after once depositing their eggs, take no further heed of them; but this has been assumed on the principle that the absence of evidence argues the absence of fact. Since observations have become more general and more numerous, there seems sufficient ground for believing that the apathy of snakes, as regards their young, is assumed rather than proved. The evidence of incubation which occurred in the Zoological Gardens, and several reported, but rather discredited, instances of the

common female snake having been found in hot-beds covering her eggs with her body, have taught us greater caution in the building of hypotheses on the absence of observed fact: it is a parallel case to the erection of houses without foundations.

THE LIZARD SNAKE (*Coluber austriacus*).

The Smooth Snake.

Coluber austriacus, *Buon. Fauna Italica*, with figure.

Coronella lævis, *Schinz*, vol. ii., p. 45.

The teeth of the Lizard Snake are slender and pointed, and slant backwards; the eyes are small; the body is cylindrical, the neck not being distinct, the head seeming more closely united with the body than in the common snake; the tail is short and stout; the dorsal scutes are arranged in nineteen series, and are entirely without keels; the ventral scutes are one hundred and sixty-two in number, and the subcaudal scutes in the specimen I have counted are sixty-two pairs. The colour of the back is olive-brown with two parallel rows of black spots, which vary in size and intensity in different individuals: those nearest the tail are invariably smaller and less distinct. In some specimens the spots are scarcely distinguishable; in others they are bright, distinct, and ornamental.

Like the Common Snake, the Lizard Snake varies considerably in size: the discrepancy, as in that species, is in all probability dependant on age and sex: it is, however, decidedly less than the Common Snake—the female, which is invariably larger than the male, rarely attains a length of two feet.

The food of the Lizard Snake consists almost entirely of the Sand Lizard (*Lacerta Stirpium*), but there is excellent evidence that the Common Lizard (*Lacerta agilis*) may be included in its bill of fare, when the two reptiles occur in the same locality; indeed, some of the records are so obscurely worded as to leave it doubtful which species of lizard is intended: there is also a well-authenticated instance of the Lizard Snake having, when in confinement, devoured a Blind-worm.

We are indebted to Dr. Gray, of the British Museum, for first identifying this snake as the Coluber austriacus of Continental authors: it is, nevertheless, open to considerable doubt whether a young individual had not been previously described by Mr. Sowerby, in his 'British Miscellany,' as a species new to Britain, and figured in the

third plate of that work, under the name of Coluber dumfriesiensis: the figure, however, does not support this suggestion, neither does it agree better with the Common Snake. On this subject Mr. Bell makes the following observation: "There is, I think, great reason to believe that it [Coluber dumfriesiensis] was a very young Natrix torquata, [Coluber Natrix], but differing certainly, in many respects, from the usual appearance and characters of that species: it was three or four inches in length, of a pale brown colour, with pairs of reddish brown stripes from side to side over the back, somewhat zig-zag, with intervening spots on the sides. The most remarkable peculiarity mentioned, however, is that the scales are extremely simple, *not* carinated; the abdominal plates were one hundred and sixty-two—those under the tail about eighty."—*Bell's 'British Reptiles,'* p. 60.

It will be seen that the ornamentation of this little snake does not correspond with that of any known British species; but the peculiarity of the dorsal scutes, as well as the number of ventral scutes, agrees with that of Coluber austriacus.

The first unquestionable evidence of the existence of the Lizard Snake in Britain was supplied by the Hon. Arthur Russell, and kindly communicated to the 'Zoologist' by Dr. Gray as follows:—

"The Hon. Arthur Russell has sent to the British Museum a specimen of the female Coronella austriaca [Coluber austriacus], which was taken by a resident, near the flag-staff at Bournemouth, Hampshire,—the habitat of the larger heath lizard (Lacerta Stirpium). These species are found together not uncommonly, and generally distributed over Europe. The snake is said to live on the lizard: this is one of the most interesting additions to the British Fauna which has been made for many years, as it is not common to find a new vertebrate animal except occasional visitants: this snake has small scales, is brown, with two lines of darker spots down the sides of the back, a dark blotch on the shoulder and head, and a blackish streak under the eye. It is like a viper in size and general appearance, but wants the dark lozenge-shaped spots on the back."—*John Edward Gray, in 'Zoologist,'* p. 6731.

This interesting communication was shortly followed by another from that eminent and indefatigable zoologist, Mr. Bond, who appears to have met with the species four or five years earlier, although he had not identified it with Coluber austriacus. Mr. Bond's communication is as follows:—

"I captured a specimen of the new British Snake Coronella

austriaca [Coluber austriacus], five or six years ago, in June, near Ringwood, Hants, when I was after Eulepia cribrum: I thought at the time I had something new, but, not taking much interest in the reptiles, it was put into spirits and forgotten until I saw Dr. Gray's notice in the 'Zoologist.' I have sent the specimen to the British Museum, so that any one may see it. If this species always accompanies the Sand Lizard (*Lacerta Stirpium*), it may possibly be found nearer London, as I have found the Sand Lizard at Weybridge, Surrey."—*Frederick Bond, in 'Zoologist,'* p. 6787.

This communication was afterwards supplemented by a third from Dr. Blackmore, who found not only our three British Snakes, but also our two British Lizards, within the compass of fifty yards, at Mr. Bond's Bournemouth Station. He took two specimens of the Lizard Snake home, and kindly sent me the following notice of their proceedings:—

"My friends, the Smooth Snakes, when first caught, hiss and bite freely, but soon release their hold; unlike the ringed snake, they do not emit any disgusting secretion when irritated; their voice, if I may use the term, is a different tone, being softer and more feeble than either that of the adder or common snake; they are also far less shy and more easily tamed than the common snake. On the second day after the capture I procured three full-sized viviparous lizards, and placed them in the glass jar with the snake: it immediately became excited, and in a few minutes seized one of the lizards a little in front of the hind legs: the lizard was perfectly undaunted by this procedure, and returned the compliment by turning and seizing with its mouth a small piece of the skin about the middle of the snake's body. The snake, after twisting in every direction, shifted its hold and bit the lizard across the middle of the body, and finally set to work at the head, gnawing it like a dog does a bone, but still, in spite of this, the lizard held firmly on. This contest lasted for more than ten minutes, and then the snake seemed to consider it a bad job, and ceased biting the lizard, which, having gained a victory, soon let go its hold and ran away: the poor lizard had, however, suffered most in the conflict, and died the next day. The snake now turned its attention to another of the lizards, and this time seized it by the root of the tail, which of course came off, and was quickly swallowed: barely had the tip disappeared from sight, before the snake suddenly caught the tailless lizard by the head, and, by the usual slow process commenced gorging its prey—an operation that took exactly sixteen minutes by my watch.

In the night, or early the next morning, the third lizard was eaten by the same snake. My second capture was somewhat of an epicure, and at present has consumed more tails than lizards; it does not, however, confine itself entirely to tails. With regard to the same tail-eating propensity of this snake, I may mention that three of the viviparous lizards which I caught had previously lost their tails, but in what manner is entirely open to conjecture."—*H. P. Blackmore, in the 'Zoologist,'* p. 9735.

These most interesting records, of course, induced a more extended and general search for the "new Snake,"—a search that was rewarded by the capture of many other specimens, records of which appeared not only in the 'Zoologist' but in the 'Field' newspaper, and many other Journals which occasionally contain Natural-history notices. Although it may, perhaps, be thought unnecessary to say more on the food of this snake, I cannot resist the temptation to cite two more corroborative paragraphs, not only on account of their intrinsic value, but also on account of the high reputation of the writers as leading herpetologists.

"A large male specimen of this snake, which I kept for a long time on account of its tameness, fed exclusively on lizards, never on mice or frogs. After having fed it for some time with ordinary sized lizards, proportionate to the size of the snake, I brought a very large specimen of Lacerta agilis to its cage, in order to try the strength of the snake. The lizard was immediately seized; but after a long fight, during which the lizard several times appeared to be entangled in the writhings of the snake,—always managing, however, to free its head which had been seized by the snake,—the latter changed the point of attack, and got hold of the tail of the lizard: this, of course, broke off, and was devoured by the snake. From this time the snake always seized the tails of the lizards given him for food, without further attacking them; nor, if tailless lizards were put to him, would he attempt to devour them."—*Dr. Günther, in the 'Zoologist' for October*, 1862.

The other and last quotation on the food of the lizard is translated from the writings of Dr. Opel, by the Rev. W. W. Spicer, who obligingly sent me the translation for publication in the 'Zoologist.'

"Wyder states that 'the Coluber austriacus devours small lizards, round which it twines itself, crushing them after the manner of the great tropical serpents. Sometimes it seizes its prey by the tail, and

if the latter breaks off it is swallowed at once. In captivity lizards are preferred to any other description of food.' I can fully confirm this statement of Wyder. The animal I have described above is the only one I ever saw take its food; the first instance occurred in this way:—In the year 1857 I was in possession of such a number of snakes of various species that I was obliged to place my Coronella, from the Fürstenstein Grund, in the same cage with a blindworm (*Anguis fragilis*), which had been there for some time already. The two appeared to be good friends, and took no particular notice of each other: both passed into their winter sleep as the cold came on, and with the return of spring again woke up and shared the cage in peace, coiled up together on the side where the sun's rays struck warmest. The Anguis ate freely of the earthworms offered to it, though all attempts failed to induce the Coronella to take any food: small lizards placed near it were allowed to crawl away without notice, and even young mice were disregarded. One morning (May 9th) I observed a great commotion in the cage: at this time the Coronella had not cast its skin, nor had it eaten anything for nearly nine months: the blindworm was striving to escape the fixed gaze of its companion, which was following it all over their prison. I placed some fresh water in the cage, and just at that instant the snake threw itself with irresistible force upon the blindworm, fixed its teeth into its head, and, flinging fold after fold of its body round its victim, held it in a vice-like grip, exactly after the manner of the giant serpents of the tropics; so tightly, indeed, did it embrace the unhappy blindworm, that the contents of the latter's intestinal canal were violently forced out and scattered over the glass sides: each desperate struggle of the blindworm was followed by a closer grasp on the part of the Coronella, which looked exactly like a roll of tobacco, through which the extreme end of the blindworm's tail protruded. The act of swallowing was very slow at first: every contraction of the muscles of the throat and jaws was accompanied by a lateral movement of the head—the hooked bent teeth, first of one side then of the other, catching a fresh grasp of the victim, and gradually drawing it in. The process of deglutition began at 9·30 a.m., and was not concluded until 12·45; the blindworm was eleven inches long; the head alone occupied more than an hour: even at one o'clock, when the Coronella opened its jaws wide, which it continued to do repeatedly after taking its food, I could still see the end of the blindworm's tail; the fact was, it was too long to be taken in entirely, and therefore gradually slipped down, as the

portion first engulphed was digested. After the meal was quite finished, the Coronella sought out the water, and seemed to take great pleasure in bathing, remaining in it for an hour at a time—no doubt to mitigate the great heat generated by its wonderfully active digestion."—(Zool. 9507).

In this extract, which relates to Continental specimens, it will be seen that two important additions are made to our previous knowledge. *First*, that the Lizard Snake will devour the Blindworms as well as Lizards; and, *secondly*, that it will occasionally involve its victim in its crushing folds, after the manner so common among the larger ophidians.

Schlegel informed us that the Lizard Snake is viviparous, the eggs taking three or four months to hatch inside the mother; and that in August she brings forth eight or ten living young ones, which are at first perfectly white. In the 'Field' for October, 1862, Mr. Buckland records the parturition of a female captured in the New Forest, and gives details of the little family which leave nothing to be desired.

"The old mother snake is coiled up in a graceful combination of circles; her little family are nestled together on her back; they have twisted their tiny bodies together into a shape somewhat resembling a double figure of 8, and there they lie basking at their ease in the mid-day sun; the old mother is vibrating her forked tongue at me; the little ones are imitating their mother's actions, and are vibrating their tiny tongues also; the mamma's head is most beautifully iridescent in the sun, and her babies are in this respect nearly as pretty as their mother: they are about five inches long, about as thick as a small goose-quill, and smoother than the finest velvet; their eyes are like their mother's, their tails are unlike their mother's; she has lost the tip of her tail, her young ones have not—they are tapered off to a point as sharp as a pin. Their skins are of a brownish black colour, and marked like their mother's, only that these markings are not yet well developed; the scales on the under parts of their bodies are of a beautiful pale glittering blue; altogether they are real little beauties." —*Frank Buckland, in 'Field,' October*, 1862.

In order to complete my account of this interesting species, it is necessary to say something of its mode of ecdysis or sloughing; and here I am again fortunate in having Mr. Spicer's translation of Dr. Opel's observations before me, so that we have now as satisfactory a life-history of this comparatively new species as of either of the reptiles that have been familiar to us from childhood.

"The ground colour of this animal was of the yellowish hue which usually precedes the casting of the skin: that process accordingly began within four days, but went on so slowly that more than once I assisted nature by removing the epidermis with a pair of pincers. From memoranda made at the time, I find that the colouring of the new skin was by no means so bright and fresh as usual; and I see in this circumstance a confirmation of an opinion, which I have elsewhere expressed, that the pigment layer contributes largely towards the formation of the epidermis, and is itself renewed from within; for my snake not having touched food for a long time previous to its sloughing, it follows that the vital operations were weak, and the secretion of pigment weak in proportion; hence the dullness of the colours beneath the epidermis. Hybernation interrupted the casting of skin that should have followed, and it was not until the 18th of June of the ensuing year (1858) that the process occurred again; but this time it was both easier and quicker, the whole being finished by the 20th of the same month, as I had taken the precaution of having a number of rough objects placed in the cage for the animal to rub itself against. I should mention that the cage in which the Coronella was confined was provided with glass sides and bottom, so that all its movements could be carefully observed without the animal itself being disturbed. A third sloughing (the second of this year) took place on the 2nd of July, the Coronella having repeatedly taken food a fortnight previously. This time I allowed the animal a certain amount of freedom, having turned it loose in my study to see if the process would be thereby facilitated. I noticed that it took advantage of every rough spot it could reach to rid itself (by rubbing) of the dried integuments with which it was encumbered. When about half the body was freed, I observed it creep rapidly on to the support of a small round table, and then, insinuating itself with much exertion into the interstices of the wooden arched foot, in an instant it left its epidermis hanging in the narrow space. The whole affair, from the first splitting of the skin on the head to a complete renewal, occupied just three hours and a half. Owing to the continuous friction the cast skin was torn in several places, whereas, in the previous instances, it had come off entire. The last sloughing commenced on the 14th of August, and proceeded just as quickly; indeed, the animal became more than usually brisk after it, for it swallowed a small lizard the same day, and another larger one two days after." (Zool. 9506.)

Family VIPERS (*Viperidæ*).

Have no maxillary teeth in the upper jaw, but a single row of very small palatal teeth on each side of the palate, and in addition to them there is articulated to each ramus of the upper jaw a small but distinct supplementary bone, which bears an elongate and curved tubular poison-tooth or fang. There is no pit or depression on the side of the face, as in the family of Rattle-Snakes (*Crotalidæ*). We have but one British species,

The VIPER (*Pelias Berus*).

Common Viper, Adder, Common Adder: varieties as regards colour are also called Red Viper, Blue-bellied Viper, Black Viper, Chersea Viper.

The Viper being the only British representative of the family Viperidæ, a considerable amount of repetition becomes necessary in compiling the description, since the characters of the species must of necessity be those of the family. The head is flattened on the crown, and considerably dilated behind the eyes: the gape extends the entire length of the head. I have found no teeth inserted in the maxillary bones of the upper jaw, but there is a single row of very small sharp-pointed teeth on each side of the palate; and also a single series of ten or twelve teeth, sharp-pointed and bent backwards towards the throat, on each side of the lower jaw. In addition to these there is a single tubular tooth, or poison-fang, on each side of the upper jaw: this is not absolutely fixed in the maxillary bone itself, but in a small separate or supplementary bone which is articulated to the maxillary bone, and the muscles attached to it are so formed and arranged that the fang, at the will of the animal, can either be projected at a right angle with the maxillary bone, or entirely concealed among the folds of integument within the mouth. The neck is manifestly restricted, but scarcely so much so as in the Common Snake; the body gradually increases in size to the middle, and is of nearly uniform diameter thence to the vent, from which point it rapidly and rather suddenly tapers, and terminates in a pointed tail: the dorsal and lateral scutes are keeled, and form eighteen longitudinal series. The ventral scutes vary in number: in five specimens, counted with the greatest possible care, there were found to be respectively 146, 148, 156, 156 and 178; the numbers of subcaudal scutes

in the same specimens were 28, 28, 29, 33 and 34 pairs. In Partington's 'British Cyclopedia' (1837) the ventral plates are said to vary in number from 144 to 177, and the caudal plates from 29 to 68. Professor Bell (1849), Lord Clermont (1859), and Mr. Cooke ('Our British Reptiles,' 1865), agree in stating the number of ventral scutes to be "about 140 to 150, and the subcaudal scutes about thirty-five pairs."

The ground colour is very variable: I have killed vipers in which it was putty-coloured, ochreous-yellow, brick-dust-red, umber-brown, and dull black. Probably this variation in ground colour is due in a degree to the age of the skin, or, in other words, to the greater or less length of time that has elapsed since the last ecdysis or moult—a contingency not sufficiently appreciated by naturalists who, having a dead viper of somewhat abnormal colouring brought to them, at once proceed to describe it as a variety or even as a species. Those who have observed a viper in captivity, particularly before and after an ecdysis, must have been struck with the altered tint and greater brilliancy of markings immediately after the completion of that event. But whatever the ground colour, there is almost invariably a dark brown, medio-dorsal, sinuous stripe commencing behind the head, and nearly reaching the tail, where it becomes broken up into spots or blotches. Sometimes this stripe is interrupted throughout its course, and its place occupied by a series of trapeziform blotches connected together by a mere thread of the same dark colour; and sometimes again, although very rarely, this connecting thread is wanting and the stripe is replaced by a series of black spots or blotches: on each side of the body there is also a row of nearly circular black spots, and on the crown of the head is a single black blotch, always separate from the medio-dorsal stripe and divided posteriorly in the form of a letter V, so as to include the anterior extremity of the said stripe: the scutes covering the margin of the upper jaw are whitish and generally four in number; those on the margin of the lower jaw are yellowish, smaller and seven or eight in number.

The average length of a viper is two feet; the females are longer than the males, and when pregnant very much stouter: I have rarely seen a viper much exceeding the length I have mentioned, and those which are shorter are generally young and immature

The viper produces its young alive, and although there is an investing, flexible pellicle to each, somewhat analogous to that found in the egg of the domestic fowl within the calcareous shell, yet this is

ruptured and disappears before the act of parturition; and the young, even before that event, have acquired all the powers essential to self-preservation. The viper seems to be at enmity with all the world, and all the world at enmity with it; and it is so with the young: they are quite ready to do battle with all comers on their very first appearance on the stage of life. It is no uncommon event for the gravid female to be slain, for it is her pleasure when in this condition to lie coiled up on some soft mossy bank exposed to the direct rays of the sun, and perfectly motionless, so that she becomes an easy victim: her death is always a violent one; repeated blows with the stoutest stake that can be found effect this object; and the violence used very commonly causes the expulsion of the young,—sometimes through the natural aditus, but more generally through the ruptured cuticle of the belly. Immediately on liberation, the little ones erect their heads, hiss, vibrate their tongues, and exhibit every possible evidence of hostility, proving that their energetic ideas of self-preservation are instinctive rather than educational. Philosophers have suggested that the apparent lethargy of the pregnant viper, and disposition to avail herself of the solar heat, is also a natural instinct, and intended for maturing the young prior to extrusion. Be that as it may, the fact, when observed for the first time by those who can read and write, always insures a faithful record: we are a wonder-loving people: the event is handed to the reading public in this stereotyped fashion. "*Viper swallowing her young.*—On Saturday last I killed a *remarkably large* female viper—newspaper vipers, or other specimens of nature, are invariably *remarkably large* or *remarkably fine*—by repeated blows with a hedge-stake which was fortunately at hand; but the strange part of the affair is this, that while I was belabouring the reptile with all my might, I distinctly saw two young ones which had taken refuge in her mouth, come out and wriggle away among the short grass: that there could have been no mistake about the matter is proved by the fact, that I afterwards opened the dead parent and took eight more living young ones out of her stomach, and have them now in spirit for the satisfaction of the incredulous.—ONE WHO KNOWS." A great deal of correspondence took place in the 'Field' and 'Gardener's Chronicle' newspapers on this subject; "Protestant Governesses," "Country Clergymen," "Constant Readers," "Justices of the Peace," Old Subscribers," &c., confidently recording similar experiences; Naturalists possessing more distinctive names, as confidently arguing that there was some mistake or imperfection in the

observation. The controversy waxed warmer and warmer; experiences more and more frequent; details more and more minute; denials more and more positive; until Mr. Buckland deposited two sovereigns at the 'Field' office as the reward for any one who would bring to that office a female viper with the young ones still in her stomach. The viper was to be killed after having been seen, like Saturn of old, to swallow her own progeny; and her neck was then to be tightly tied round with a string. Some three years or more have elapsed since the offer was publicly advertised, but no claimant for the sovereigns has appeared; indeed, immediately on the offer being made public, the subject was dropped and has never since been revived.

The viper feeds almost exclusively on field mice, shrews, voles and moles; the last dish I take rather on trust, never having found any portion of this rather bulky vermivore in the stomach of a viper.

It seems scarcely right to conclude my account of the viper without saying something more about its venomous property, and supposed death-dispensing propensity; my own view of the subject is probably unique, and amounts to what is usually called a crotchet: it may be briefly stated thus, "that the object of the poison possessed by this family of ophidians is simply to numb or kill the prey, which is always living when captured." It is, I think, universally believed that this weapon, if I may so call it, is one of offence or defence as regards man or the larger animals; but if we consider the fearless manner in which eagles, buzzards, secretaries and falcons make the poisonous snakes their favourite prey, and that they have never been known to receive injury from the fangs of these creatures, it must be clear that as a means of defence the poison is perfectly *effête*. There also seems some difficulty in reconciling the account we read of the sidelong blows given by the viper with our precise knowledge of the position and structure of its poison-fangs; but this is a difficulty I am unable to solve: the following memorandum by an old correspondent of the 'Zoologist,' if not conclusive, is, to say the least, most interesting and suggestive.

"When a viper is struck it first coils itself up, leaving its head in the centre or at the summit of the coil, and drawn a little back, as if for the purpose of reconnoitering. Speedily the animal uncoils itself like a spring; its body is then launched out with such rapidity that for a moment the eye cannot follow it: in this movement the viper clears a space nearly equal to its own length; but it never leaves the

ground, where it remains supported on its tail or posterior portion of the body, ready to coil itself up again and aim afresh a second blow, if the first should fail. To do this the viper distends its mouth, draws back its fangs, arranges them in the right direction, and then plunges them into its enemy by a blow of the head or upper jaw: this done, the fangs are withdrawn. The lower jaw, which is closed at the same moment, serves as a point of resistance and favours the entrance of the poison-fangs; but this assistance is very slight, and the reptile acts by striking rather than biting. There are times, however, when the viper bites without coiling itself up and then darting forth; this occurs, for instance, when it meets with some small animal, which it destroys at leisure and without anger, or when it is seized by the tail or middle of the body, in which case it turns round and plunges in its fangs. As the teeth are buried in the tissues of the body struck, the poison is driven down the canals which pass through them by the action of the muscles which close the mouth, and the injection takes place with a force proportionate to the vigour and rage of the reptile, and the supply of poison with which it is furnished."—*Moquin Tandon's Zoologie Medicale, as translated by Mr. Cooke in 'Our British Reptiles.'*

The poison, which is a pale straw-colour and liquid,—something like what we should imagine fluid amber,—is without taste or smell, and, by repeated experiments on men and animals, has been proved perfectly innocuous when taken into the stomach: it is secreted in a spongy gland situated below the ear, or rather below the usual site of the auditory organ, for there is really no proper ear: the poison passes forwards along a tube concealed in the muscle of the jaw, until it reaches the base of the fang; it then descends through the fang with the action of biting, and of course enters the object bitten. A great deal has been written on the effect of temperature in increasing or diminishing the virulence of the poison, but, so far as I have been able to discover, the experiments have proved little or nothing: it seems clearly established that the supply of poison is limited; that after the first discharge the effect is greatly reduced, and that the creature may, by continued irritation, be induced to repeat its bites until the poison is exhausted and the bite become perfectly innocuous.

Like the Common Snake, the Viper becomes torpid in winter; it has frequently happened that a little company of these reptiles—ten, twenty or even more—have been found coiled up together in a strange mass in the hollow of a pollard willow, oak or hornbeam: they appear

entirely lifeless until the increased temperature of spring arouses them from their sleep, and the cravings of appetite remind them that months have been passed without food. During the winter that is even now scarcely passed away, snakes, blind-worms and vipers have revived and come abroad in January and February, influenced no doubt by the unusually high temperature of those two months. Like the wood-pigeon, the viper has increased in number with the destruction of birds of prey, and in some parts of Scotland has become a dangerous nuisance; for although the bite is rarely fatal, except to the animals on which the viper feeds, its effect is always injurious, producing pain, fever, vomiting, and swelling of the bitten part.

EDWARD NEWMAN.

(To be continued.)

PS.—*Lacerta agilis sometimes Oviparous.*—I see in the 'Zoologist' you attach but little importance to the fact that Lacerta agilis is stated to be ovo-viviparous (S.S. 1627). It may be interesting to you to know that Mr. George Verrall, of Lewes, had some in captivity—I think it was in 1867—and that he particularly drew my attention to the fact, that the females produced *eggs*, and I certainly saw some at his house: the young, at the time I examined the eggs, were evidently about to be extruded, as the movements of the little creatures were plainly visible through the investing membrane; it therefore appears that the eggs are not *always* matured in the ovary of the female before extrusion.—*J. Jenner Weir; 6, Haddo Villas, Blackheath, S.E., April* 5, 1869.

[Two other communications from naturalists in Surrey and Kent respectively are precisely to the same effect as Mr. Weir's: but not having been printed at the time, and one of the observers (the late J. D. Salmon) being no more, I believed it best to pass them without notice until the receipt of Mr. Weir's note: in all three instances the writers refer to Lacerta agilis and not L. Stirpium. It remains to be seen whether L. Stirpium is sometimes viviparous or ovo-viviparous. In any case the employment of this physiological character as either generic or specific must henceforth be abandoned.—*Edward Newman.*]

Ornithological Notes from North Lincolnshire.

(Continued from Zool. S. S. 1544.)

JANUARY, 1869.

Kingfisher.—January 5. The stomach of a kingfisher, the muscular coat of which is very thin, dissected to-day, was crammed with very sharp needle-like bones of some small species of fish.

Teal.—January 20. A teal drake shot to-day on the stream had acquired the full mature plumage.

Wigeon.—January 23. The males of this beautiful species are now in full plumage. On the 27th there was a flock of forty off the mouth of our creek, all full-plumaged males. On the 15th February a large flock, seen near the same place, was composed of males and females, swimming together in pairs. Wigeon may be readily distinguished, even at great distances, from other ducks frequenting this coast, as they look—like the traditional pirate craft of the novelist—long and low in the water. On the 10th of March, I was amused in watching a flock of these ducks from the bank with my telescope: the tide was rising rapidly, and had already reached the embankment; the ducks were drifting in with it, every bird (thirty-three in number) asleep, their bills tucked beneath the scapulars; nearer and nearer they drifted—now almost within shot. I had laid down my telescope, and taken up my breech-loader, in expectation of a double shot; ten yards nearer, and I knew that at least two were doomed. Just too soon an old drake raised his head—I am certain he could not see me, and the wind was blowing towards the coast, yet evidently something was wrong; perhaps it was the nearness of the shore that alarmed him; be that as it may, the cautious bird instantly, in some way or other, communicated his fears to the rest—every head was raised, and each duck was paddling for dear life rapidly seawards: had they seen but the tip of my cap, every duck would have instantly risen, and not have trusted to swimming.

Partridge.—I have known partridges pair earlier than has been the case this season: on the 25th, although some had paired, many large coveys were unbroken; pairing was not general before the first week in February.

Wood Pigeon.—There are three acres of cabbages close to a plantation about a mile from this place, completely destroyed by these birds; every portion of the leaf is eaten except the central midrib

and some of the strong sideribs: the plants look as if riddled by caterpillars. The almost total loss of the Swede crop has probably induced these birds to levy contributions on the cabbage-fields. The increase during the last twenty-five years of this species in North Lincolnshire is remarkable; it is certainly not consequent on any increase of plantations, or through waste land brought under cultivation, little or no change in either respect having taken place; their present abundance is attributable, I fully believe, to one circumstance alone —the all but total destruction of the falcons and hawks. When will our game preservers, and their ignorant keepers, learn common sense, and understand that falcons and hawks are not incompatible with abundance of game? The wood pigeon was the natural food of the falcon, and much more likely to be stricken than either pheasant or partridge. Now, thanks to the extermination of the birds of prey, the ring dove—to say nothing of the injury done to the farmer—consumes an immense amount of food which would otherwise go into the crop of game birds. I have sometimes thought that in this district, at least, where game is not as a rule artificially reared and fed, as the wood pigeon increased the flying game has decreased: I know, too, that late in the season, when birds are wild, that both in cover and turnip-field the sudden rise of a flock of wood pigeon will disturb all the game in the neighbourhood. Restore our falcons and harriers, and we shall then probably not hear so much of that bane of the moor-shooter—the dreaded grouse disease. I was much struck lately by the remarks of a writer in one of the monthly magazines;* speaking of the grouse disease, he writes—"I still, however, most honestly believe that the wholesale destruction of the birds of prey, especially of the peregrine falcon, has been a great curse—not at all because she prevented overstocking, for man can prevent that with his gun, but from the circumstance that hawks take the weakly and diseased birds first, simply because they can catch them easily. Nature knew that, in her own course, diseases would come; she knew also that, to prevent them spreading, they must be stamped out; and she sent her falcons on the moors: her armed cruisers sailed out to sweep the seas of the pirates that infested them; but man knew better—he looked only at the good of the moment—he defied her laws, and broke her balance altogether." And so, undoubtedly, in the case of the wood pigeon. Man has destroyed the balance, not alone to the injury of

* 'Saint Paul's Magazine,' June, 1868.

the agriculturist, but doubtless, as it will some day or other be found, to the disadvantage of the game preserver.

Stock Dove.—This species is of very rare occurrence in North Lincolnshire: I have on several occasions lately seen five feeding in the stubble-fields in the marshes; they are excessively wild and wary, much more so than the ring dove. On the wing their flight and appearance is much the same as in the common domestic bird.

Goldeneye.—January 26. There was a beautiful old male goldeneye off the mouth of the creek to-day; I watched him for nearly an hour through the telescope; this duck swims rather high in the water: it was constantly diving, keeping beneath, on the average, till I could count slowly to forty-eight, and not remaining on the surface between each dive longer than counting to twelve—consequently spent four-fifths of its time under water.

Ice Duck (Fuligula glacialis).—The stomach of this duck, sent to me by Mr. J. H. Gurney, jun., contains a considerable quantity of small shells of the genus Buccinum, and a few Patella pellucida, also the remains of shrimps.

FEBRUARY.

February 1. Chaffinch, yellow bunting and greenfinch paired.

February 2. Spring note of blue tit.

Scaup Duck (Fuligula marila).—February 10. Have lately noticed small flocks of these ducks on the coast: one to-day, off the mouth of the creek, numbered fourteen birds—seven males and seven females, all in mature plumage. These ducks swim high in the water, are expert divers, remaining underneath longer even than the goldeneye, and I have frequently counted fifty to fifty-four from the dive to the reappearance. Lately, on several occasions, I have seen three come at high-water close in shore, diving in very shallow water; they daily come up with the tide near the same place; one is in the plumage of the mature female, the others are young males in the transition dress, changing from the female garb of the first summer to the male of the second: they have a curious mottled and nondescript appearance.

Dunlin.—February 15. An immense flock of dunlin on the "Flats" this afternoon, probably not less than ten thousand birds.

Brownheaded Gull.—February 25. Have in a few instances acquired the brown summer cap.

MARCH.

Golden Plover.—March 2. Examined through the telescope, at the distance of about 300 yards, a flock of golden plover; already several show indications of a change to the summer plumage: six are much marked on the under parts with black, in the proportion of two parts black to one white, and one bird is all but in full summer plumage.

Pied Wagtail.—March 6. First seen, several observed; have not, as is now usually the case, seen any during the winter.

Fieldfare.—March 9. Several flocks in the marshes; they are feeding on the haws, which, thanks to the mild winter, are still plentiful on the hedgerows.

White Wagtail (M. alba).—I have remarked in previous numbers of the 'Zoologist,' on the occasional appearance of this continental species in North Lincolnshire. The last noted was on the 5th of May, 1866 (Zool., N.S., 295). On the 23rd of this month I was talking to a brickmaker, who has a yard on the Humber fitties, when a white wagtail alighted within fifteen yards—curiously enough it was close to the place where I had seen the bird already recorded in the 'Zoologist.' I had a very perfect view of the little fellow as he sat perched on the flats on a sod of Armeria maritima, broken by the waves from the fitties—his black cap contrasting strongly with the very light pearl-gray back; there is also much more white on the sides of the neck and flanks than is seen in M. Yarrellii—it is altogether a whiter, more delicate and graceful bird: when once seen, it may readily be distinguished from either the male or female of the pied species, even on the wing and at some distance. I was surprised to find that the brickmaker, who is both a good observer and a famous wild-fowl shooter, was aware of the difference between these two species: he has sometimes in the spring seen the "light-coloured sort" about his yard, but considered it very rare. Anxious to procure a specimen I fired at short range, but, having only large shot, failed; I spent an hour searching the fitties for my bird without success. In the brick-pit were two pied wagtails, male and female, which I watched within a few yards; seeing these so soon afterwards made the difference between the two species more striking. I was not aware, previous to reading Mr. Stevenson's * remarks on this species, that it was so rare a bird in eastern England: that it may *occasionally* at this season be

* 'Birds of Norfolk,' vol. i., p. 163.

found on our coast I am certain, and I trust ere long to obtain specimens.

JOHN CORDEAUX.

March 31, 1869.

Errata.—In "Ornithological Notes from North Lincolnshire" (Zool. S. S. 1543), paragraph "Woodcock," line two, *for* "heard of them" *read* "heard of *three*." In "Notes on Bird Parasites" (S. S. 1587), lines three and four, *for* "ten sharp crooked claws" *read* "*two* sharp crooked claws."—*J. C.*

Ornithological Notes from Pembrokeshire.

By THOMAS DIX, Esq.

(Continued from Zool. S. S. 140).

Peregrine Falcon.—This bird still breeds on the coast between Tenby and St. David's. I have not been so fortunate as to see the species, but my friend H. F. Bailey saw an adult bird last June by the Stack Rocks at Flimstone, near Pembroke, and Mr. Tracy of that place (to whom I am greatly indebted for information respecting the birds of his district) tells me two or three pairs still breed between Caldy Island and Milford Haven: two or three years since a nest of four young ones was taken near the Stacks by a party of eggers. Some twenty years ago this bird must have been exceedingly numerous on this coast: Mr. Tracy says—"From Caldy Island round to St. David's as many as twelve pairs could be counted during the months of May and June; they generally fix upon a situation for their nests in March, and lay in April—mostly in the old nest of a raven or crow, selecting the most inaccessible places on the cliffs; there are generally four or five eggs: in one instance I saw six young birds." Perhaps I should have begun this list with the Greenland falcon, as the bird figured in Yarrell as the gyr falcon was killed on Stackpole Warren, by the father of Mr. Tracy, of Pembroke.

Merlin.—An autumn and winter visitor, when it is not uncommon, particularly in the lower part of the county: immature birds are the most numerous.

Sparrow Hawk.—A young male was brought me in September, 1867, in singular plumage; I thought at first sight it was a young merlin: the back and upper parts are dark liver-brown, each feather edged with light reddish brown; throat light fawn-colour, with slight

longitudinal dark lines; breast and flanks pale reddish fawn, with triangular patches of reddish brown, giving the appearance of broad longitudinal markings; thighs with transverse and longitudinal markings of light brown; irides yellow.

Kite.—A fine bird, in the Earl of Cawdor's collection at Stackpole Court, is said to have been killed in Carmarthenshire: I believe it has been taken in Pembrokeshire.

Buzzard.—In May, 1866, I had the unexpected pleasure of seeing a pair at Llangranog, on the Cardiganshire coast, where I have no doubt they had a nest; I was first struck by their peculiar, plaintive note, greatly resembling the mewing of a kitten. Never having seen this bird on the wing before, and they being some 300 feet above me, I was some time before I could be sure of the species: they were mobbed by several crows and jackdaws; as they wheeled and doubled about, their rounded wings gave them a very unhawk-like appearance: I was glad to find they had selected so safe a nesting-place, it being a shelving rock overgrown with ferns and grass.

Marsh Harrier.—A fine specimen in the plumage of the first year, in the Earl of Cawdor's collection, is said to have been killed near Stackpole Court.

Hen Harrier.—A pair were killed near Troed-y-rawr, Cardiganshire, in the spring of 1868; from the description given of the male he must have been in adult plumage. Like many another rarity which would rejoice the heart of a naturalist, he was destroyed. I am sorry to say the nest was taken about the same time, and the female killed.

Scops Eared Owl.—A beautiful specimen was caught by a labouring man, near Pembroke, last spring: he was trimming a hedge at the time, when it fluttered out from the bottom: I saw it in Mr. Tracy's shop, but unfortunately he took no note of the sex or when it was taken to him.

Pied Flycatcher.—Specimens in the collection at Stackpole Court (Mr. Tracy tells me) were killed in the neighbourhood, also that the bird is occasionally seen in the spring and autumn.

Ring Ouzel.—Although I have not seen this bird, I have every reason to believe it breeds (occasionally, at least) in this district. My young friend, Arthur Phillips, of Newcastle Emlyn, took some eggs in 1867, when he distinctly saw the bird leave the nest.

Redstart.—The first time I noticed this bird was in the summer of 1866—a pair had a nest in an old bee-house at Kilwendeage: they

reared their young, and I believe returned the following summer, as another lot of young ones were reared in the same hole in the wall. Last season a pair of great tits took possession, or I think there would have been a third lot, as I noticed a pair of redstarts about the place for several days; a pair, however, reared their young in the gardens —they appropriated the hole in a wall, where a pair of pied wagtails had just reared their brood: they began building upon the old nest of the wagtails the very day the latter left it. This species is not at all numerous—I have only seen three birds besides those that bred at Kilwendeage: the men working in the gardens had never seen any before.

Black Redstart.—Mr. Tracy tells me this may be considered almost a regular visitor, as nearly every year he sees it in Pembroke, generally about the old castle: the first he noticed was in October, 1847, when he shot a female in the street close to his house: this bird is, I believe, in the Stackpole Court collection. The same week he received another bird from Tenby, which was killed on the Coburg Hotel.

Whinchat.—This bird is decidedly rare in this district: in June, 1867, I saw one pair—the only time I have seen the species.

Wheatear.—I was agreeably surprised to find this bird breeding about the north-eastern portion of the Precelly Mountains: having been told various tales respecting the birds to be found there, I was anxious to see for myself, and, in company with Mr. Phillips, of Newcastle Emlyn, I started for the purpose on the 20th of June last year; the morning looked far from promising—it was a thick fog, nearly as bad as rain, but we determined on trying: we had about seven miles to drive to our starting point; by the time we reached it the fog was gone, and the weather was all we could wish. At Carn-Menin we began our walk by crossing a peat bog, upon which large boulders cropped out: here I first saw some wheatears, evidently a family party; there were also a few meadow pipits, and just below the rocks which give the name to the place two carrion crows were looking for food. The rock here is very peculiar—it is in large detached masses, riven and piled much like a rubbish-heap of a large quarry: many of the blocks are balanced so that they can be easily rocked, and when struck give a ringing sound. In walking to the rocks west of Voeltrigarn—I believe called Carn-alw, which, according to Mr. Phillips, means "The Rock of Calling," probably from there being an echo there—we found Lycopodium clavatum common, and about a dozen plants of L. Selago; in the bog in the direction of

Voeltrigarn sundew was growing in the greatest profusion: here we found the remains of a young common snipe about half fledged, but saw no old birds; three herring gulls and one lesser blackbacked gull were on the bog, but very shy—I was, however, able to distinguish the species: they are said to return to the coast every evening, which is only about five miles as they would go. I thought we should have found more species of birds, and so far was disappointed, but we gained information only to be had by such a walk,—and many, if not all who take the trouble to see for themselves, have experienced the like. The hen harrier I have no doubt bred on these mountains a few years since, as an old man very correctly described the bird to me; he lives near, and says now and then one comes in the winter; the Welsh name means, "the whitetailed hen of the mountains." Thirty years since the buzzard is also said to have been common. "Boncath" is the Welsh name for this bird, and close to this place is a little village of that name: as the names of Welsh places are generally derived from something particular in connexion with them, may we not take it as a corroboration of the statement made to me.

Grasshopper Warbler.—The first time I heard this bird in Wales was one afternoon in July, 1866—it was just within Carmarthenshire, in a boggy place overgrown with alder and rushes; since then I have heard the bird near Whitechurch, in a similar locality. Last year two males came for a few evenings in July close to this house; they were in two small clumps of blackthorn about forty yards from each other; they begin their peculiar whirring note about dusk, when I have stood within a few feet of them without their being the least disturbed.

Sedge Warbler.—As far as I am able to judge, this bird is generally distributed in the low lying localities, but nowhere numerous.

Bohemian Waxwing.—I am informed by my friend Mr. J. Phillips, of Newcastle Emlyn, that a single bird of this species was shot a few years since near Llandyssil, in Carmarthenshire.

Pied Wagtail.—Every autumn we see flocks, which stay a few days as they pass south; I particularly noted about fifty on the 16th of September, 1866; they remained about ten days, and kept very much together during their stay: this year, on the 22nd of March, I saw nine in fine summer plumage—they were all males; when I disturbed them they rose up nearly out of sight, and went off in a northeasterly direction.

Ray's Wagtail.—I have only once been able to identify this bird in this district, when five were seen on the 24th of August, 1867.

Mr. Tracy, of Pembroke, says they are regular spring and autumn migrants, only staying a few days.

Rock Pipit.—Common on the coast, where it breeds: I shot a young bird in full plumage early in May, 1866.

Common Bunting.—Since sending my previous notes (S.S. 137), I have had reason to somewhat alter my opinion as regards this species—it certainly appears to be more numerous than I previously believed: as I was driving over the mountains to Narberth last February I counted five on one bush, and saw at least a dozen others.

Blackheaded Bunting.—By no means common; a few are seen by the rivers in suitable localities.

Chaffinch.—During the severe weather in January, 1867, several were frozen to death: on the night of the 14th the thermometer fell to five degrees below zero; the next morning four of these birds were brought to me quite dead and stiff—all of them had their heads under their wings, as though they died asleep; doubtless starvation had something to do with it, but I am persuaded the cold killed them. The 30th of October following I saw the largest flock I ever noticed—there must have been five or six hundred birds; they were in a small field close to the mountains; I watched them for some time without seeing a single bird of any other species.

Crossbill.—During last autumn a few were seen in the lower part of the county; I heard three were killed near Stackpole Court.

Chough.—This bird may still be considered common round the rocky coast of Pembroke and Cardigan: they build in the most inaccessible parts of the cliffs, generally in the clefts of overhanging rocks, where it is impossible to get at their nests.

Raven.—Breeds on the rocky parts of the coast, where it is common.

Carrion Crow.—I mention this bird, as I believe some naturalists have an idea they—occasionally, at least—associate with rooks: they are very common in this district, and I have taken some pains to observe their habits: it is seldom that more than two are seen together, generally not far from the side of a wood, and it has struck me they prefer being alone; in only one instance have I seen the two species together, when a herring gull, a rook, and two crows were feeding off a dead sheep. Twelve months since a pair regularly roosted in a small plantation adjoining this house; they built and reared four young, and the family party were constantly seen in company until

the young were able to provide for themselves. I have often disturbed crows of an evening when walking through plantations, and I have reason to believe they mostly return to the same place to roost. I quite admit it is difficult to distinguish the two species at a distance, but the shorter and thicker look of the crow will not often mislead. I am greatly inclined to think the crows we hear of as being killed in rookeries are in reality rooks of the year that still retain their beards —and that keeper would be in advance of his brethren who could distinguish the difference between the species: having once said they have shot a crow they stick to it, for the same reason as the tailor who having given evidence that a certain horse was sixteen yards high—when corrected, replied "I swore to it, and I stand to it."

Hoopoe.—I see by Mr. Tracy's notes this bird has been obtained in the neighbourhood of Pembroke: one was taken on the 17th of March, 1847, at St. Twynell's; it had been seen about for several days, and was at last caught in a cottage: another was taken on board the Waterford steamer, at the mouth of Milford Haven, about the same time; and, in 1850, one was obtained near St. David's, also in March.

Bee-eater.—A specimen which I saw in Mr. Tracy's shop was killed near Pembroke; it was too much injured to tell if it was an old or young bird.

Kingfisher.—Certainly a rare bird in this immediate neighbourhood, but they are oftener met with in the lower part of the county, where they also breed.

Swift.—In certain localities these birds are numerous; I have seen considerable numbers about Kilgerran and Pembroke castles. I once saw a flock of about forty here; they were flying a few feet from the ground, and apparently took a straight line across the country,—they just rose at the banks as they sped onward in their race, for such it appeared.

Nightjar.—Not uncommon in favourable places; they prefer sheltered valleys, particularly where furze and heath are growing near plantations.

Turtle Dove.—This bird is only a straggler in this county; it has been known to breed in the woods at Orielton, near Pembroke, but I believe only on one occasion. On the 20th of June, 1867, I was surprised to see one fly across a small field here which was being sown with turnips: the same morning, within a less distance than a mile, I heard two others in different plantations; three pairs were

regularly heard and seen here for about ten days; I was careful they should not be disturbed, as I hoped they would remain through the summer; however, they all left, and we have had none since: their note is so peculiar it is not easy to suppose they would remain unnoticed, more particularly as they were several times mentioned to me during the time they remained.

Ring Dove.—As in many other parts of the country, this bird is more numerous than it was in the southern parts of the county: few persons have any idea of the damage they do to turnips and rape during the winter months.

Quail.—An adult female was shot at Boncath, near here, on the 7th of September, 1867, and was sent to me a day or two afterwards; it was flushed from amongst some rushes in a wet springy meadow, where in winter we usually find snipes: this singularly agrees with the observations in the "Birds of Norfolk:" eight or nine years ago five were seen near here, of which three were shot; and about twelve years ago three were seen near Eglwyswrw, all of which were killed; they were all found in and near similar cover to the bird I have: I think I never saw a bird so loaded with fat as that sent me,—although rolled up in four or five thicknesses of newspaper, the grease went through all; the feathers were so saturated that I almost despaired of cleaning them.

Ringed Plover.—Where the coast is favourable for their breeding they are not uncommon, although I believe nowhere numerous.

Lapwing.—Breeds in few localities.

Sanderling.—I see by Mr. Tracy's notes that a female, killed on Newgall Sands on the 1st of June, 1857, had the ovaries well developed.

Oystercatcher.—Mr. Tracy tells me they breed plentifully from Freshwater Bay round to Angle, at the mouth of Milford Haven. I saw a bird on Cardigan Island in June, 1867.

Bittern.—I have heard of two or three which were killed in this neighbourhood.

Little Bittern.—A specimen in the Earl of Cawdor's collection was killed, I am informed, in Pembrokeshire.

Night Heron.—An immature specimen in the Stackpole Court collection was shot near Pembroke mill-pond, about twelve years since, by Mr. Tracy: within twenty yards of the same spot he shot another, which he sent me on the 7th of December last; it had been killed a few days, but as the body was sent with it, I was fortunately able to

determine the sex—it proved to be a male; there is a single occipital plume about three inches long, white, tipped with dark brown; the back and wings are beautifully shot with olive-green; the white spots on the back and wing-coverts are more distinct and larger than shown in Yarrell's figure.

Spoonbill.—An immature specimen in Mr. Tracy's shop was killed near Pembroke in 1867, and he informs me two or three are seen almost every year: fourteen or fifteen years since, he had twelve taken to him in the course of a few months.

Glossy Ibis.—I see in Mr. Tracy's notes that an adult bird, in full plumage, was killed at Slebach in the autumn of 1834.

Curlew.—During the severe frost in January, 1867, five of these birds came to some catch meadows near this house; they were very watchful, but one was shot, which was in good condition: they are common on the coast.

Redshank.—Common about the mud-flats of Pembroke river.

Green Sandpiper.—Scarce, but a regular visitor to certain spots every August, but only remain a few days.

Common Sandpiper.—Said to breed here: I have no reason to suppose such is not the case, although I have not found the bird.

Greenshank.—Occasionally met with: Mr. Tracy has had several from the Pembroke river.

Avocet.—A beautiful specimen in the Earl of Cawdor's collection was killed near Pembroke.

Bartailed Godwit.—Not uncommon in the spring and autumn, particularly about the mouths of rivers, where there are large mud-flats at low tide.

Knot.—Mr. Tracy regularly meets with this bird during the winter in the neighbourhood of Pembroke.

Purple Sandpiper.—About as numerous as the knot, and found at the same time.

Water Rail.—Not often seen. Last December, as I was riding, a beautiful bird rose from the road-side ditch and perched on a willow-twig about two feet from the ground: although I was within a few yards it took no notice; the bright red beak and white bars of the flank feathers were very conspicuous.

Coot.—A regular winter visitant, but not numerous.

Gray Phalarope.—A specimen in the Earl of Cawdor's collection was, I believe, killed near Stackpole Court; and I learn from

Mr. J. H. Gurney's Occurrences of this species during the autumn of 1866,—that one was seen for several days at Caldy Island.

Common Shieldrake.—I believe that a pair or two still breed in the sand-hills to the south of Milford Haven; they are said to do so numerously in the sand-hills by Laugharne marsh, in Carmarthenshire.

Shoveller.—Occasionally obtained.

Gadwall.—Rarely seen; but one or two have been shot on the Pembroke river.

Eider Duck.—An adult male, which I believe was killed in Carmarthenshire, and an immature male near Pembroke, are in the collection at Stackpole Court.

Common Scoter.—Immature birds are not uncommon on the coast.

Redcrested Whistling Duck.—Mr. Tracy tells me he shot a female of this rare visitor at Stackpole, and that it was taken by the Earl of Cawdor to London to be identified—unfortunately he has forgotten the date.

Pochard.—Not uncommon: a single bird was shot here two years since; it was quite alone on a small pond.

Tufted Duck.—When wild ducks are particularly numerous, a few of these birds are generally to be seen.

Longtailed Duck.—Mr. Tracy showed me the notes he took of one killed near Haverfordwest, June 15th, 1843: with the exception of one white scapular feather and a few white feathers on the crown of the head and back of the neck, the bird appears to have been in full summer plumage; the white feathers remaining on the head and neck were about a quarter of an inch longer than the others.

Goldeneye.—A few are seen most winters, but adult males are very rare.

Smew.—A beautiful adult male in the Earl of Cawdor's collection was shot on the lake at Stackpole Court: immature birds are not unfrequently seen.

Redbreasted Merganser.—Occasionally obtained.

Goosander.—More numerous than the preceding.

Great Crested Grebe.—A few seen during the winter, but invariably in immature or winter plumage.

Rednecked Grebe.—Mr. Tracy assures me he has several times killed this bird on the mill-pond at Pembroke.

Sclavonian Grebe.—The same remark will apply to this species as to the great crested.

Eared Grebe.—Mr. Tracy says he has several times taken this bird on the Pembroke river.

Redthroated Diver.—Common during winter.

Great Northern Diver.—Not uncommon in Milford Haven.

Common Guillemot —The great breeding-place (at least, so far as I know the coast at present) is the Stack Rocks at Flimstone, about seven miles south-west of Pembroke; here they are to be seen in immense numbers; these Stacks are nearly on a level with the main land, and about sixty or seventy yards distant; the largest is perhaps thirty yards across, the other not half the size; the tops of these rocks are, in the breeding season, literally packed with guillemots. The first time I saw them was on a bright calm day in July: for a few moments I could not believe the brown and white moving mass before me were birds—it took time to accustom the eye to the sight, when I could easily distinguish them bowing and turning as they kept up a continual chatter; they were continually coming and going from and to the sea—it was curious to see them waddle to the edge and apparently tumble off head foremost, when they quickly gained the use of their wings. Now and then a herring gull sailed past, when it seemed as if each one was fearful for the safety of its egg, there being general bustle and an extra amount of noise. We hailed some men who were lobster catching, and, after some dumb show, my friend told me we must meet them at St. Catherine's point, for which we started: a pretty place this said point is to get down—limestone washed and honey-combed by the waves, as rough as coral, and almost as uneven; however, after scrambling down backwards and sideways, we came at last to the boat. Mr. Lewis, who lives close by, joined us; he knows the coast well, and was most acceptable company; he told the men to pull round to "the cave," and go through: a grand sight was before us as we rounded the point—an immense natural arch of limestone, with two or three small caves above it, in which were sitting some razorbills; to the right is a narrow passage, divided from the main arch by slight pillars; the razorbills came tumbling off their nests as we approached, and an egg fell into the water,—of course to be smashed. In a few moments we were through the arch, and the sky was seen through an opening fifteen to twenty yards square, and about two hundred feet above us; we might readily have fancied ourselves at the bottom of a well; a dozen kittiwakes had their nests mostly

above, and behind as we entered; in front to the right is a real cave about ten feet wide, coming to a sharp point at the top: we could only see in a few feet as it was quite dark; several razorbills flew out; one bird had a young one only a few feet above the water,—she would not leave it, although we could have reached her with an oar. We left this place by a narrow opening opposite the entrance, and as we looked a-head we appeared to be going into an amphitheatre, for the cliffs in the distance form a small bay, and the side of the cave confined our view to the left: in the distance is the principal colony of kittiwakes—the whole face of the cliff seemed white with them: immediately we are out of the cave we are below another settlement; on the right, left, and in front are hundreds—every ledge is occupied; some of the nests are apparently stuck upon the face of the rock. What a beautiful sight to see these lovely little gulls, so light and airy in their flight, and in such pure unsullied plumage, which it is next to impossible to handle without soiling; we had a good look at them, as some were on their nests within a few feet apparently indifferent to our intrusion. We next went off to the Stacks, pulling between them and the main land: on the face of the cliffs, wherever they can find standing room, were sitting great numbers of razorbills and guillemots, and we saw perhaps half-a-dozen puffins; the few ledges on the sides of the Stacks were occupied in like manner. On the west side of the Great Stack is a cave in which shags breed in safety—it is perfectly inaccessible: having rounded the Stacks, we had a splendid view of the tops which slope towards the sea—they were covered with thousands of guillemots; numerous as they appeared from the land, it was as nothing compared to this view; no words can describe the scene, and we were particularly fortunate to have had such a good opportunity for witnessing it—a calm sea and a boat within hail we might go twenty times and not meet again; there was only one drawback, we could only have half an hour in the boat, when a whole day would not have been too long; but the sailors were anxious to be off to Tenby, and, having obliged us so far, we could not grumble, short though the time seemed. I can fairly say it has left an impression which I can never forget, and often recur to with the greatest pleasure. I drove to the Stacks again on the 5th of September: it was a windy, stormy day—the wind blowing off the sea; not a single guillemot was upon the top of the Stacks, and only here and there in sheltered nooks might be seen a few with some razorbills, but the air seemed full of them flying in all directions, chat-

tering and screaming: the sea was very rough, but covered with birds riding head to wind, light as corks and as unconcerned, although almost within reach of the breakers; in one little inlet I thought I saw two or three dead ones, possibly killed by the storm.

Ringed Guillemot.—I could not distinguish this bird at the Stacks, but I am assured it has been obtained on the coast during the breeding season.

Puffin.—Common all round the coast—it seems to prefer the islands: on Caldy Island it breeds in great numbers, and I am sorry to say that on Whit Monday the boys and men of Tenby slaughtered them by wholesale; it is as much an institution with them as May-day with the sweeps. I found this bird breeding on Cardigan Island: with the exception of the herring gull, I believe it is the only sea-bird breeding there.

Razorbill.—Breeds wherever the guillemots have a station, but I believe they generally select the lower ledges of rock.

Cormorant.—Not uncommon, but not so numerous as the next species.

Shag.—Generally distributed along the coast: I am told the principal breeding places are the Islands—Ramsey, Skomer and Skokhum. I have several times seen shags fly over here in a straight line for Cardigan Bay; there is no river or any inland water in the direction they came from, so that I am inclined to think they must have crossed from Carmarthen Bay.

Kittiwake.—I have before mentioned this little gull breeds in great numbers at Flimstone: they keep mostly by themselves.

Lesser Blackbacked Gull.—This bird is by no means numerous.

Herring Gull.—Common all round the coast.

Manx Shearwater.—Common; numbers breed at Caldy Island, and also upon Skomer and Skokhum: they select deserted rabbit-holes, which they seldom leave before dusk, and therefore escape the notice of the casual observer.

Forktailed Petrel.—Has several times been taken after severe storms at Milford Haven; I saw a specimen in Mr. Tracy's shop, taken near Pembroke.

THOMAS DIX.

Llwynbedw, Kenarth, Llandyssil.

Otter near Wakefield.—About the 3rd of February an adult otter, weighing twenty-three pounds, was captured in the river Calder, at Stanley, near Wakefield.—*George Roberts; Lofthouse.*

Hybrid between Bactrian Camel and Dromedary.—It being generally understood that the Bactrian camel and the dromedary, while in captivity, will not interbreed, I beg leave to crave space for the insertion of the following:—A female dromedary belonging to this menagerie, when at Bedford a few days ago, dropped a fine calf, the sire of which is a pure Bactrian or double-humped camel, and the hybrid possesses the distinctive characteristics of both parents: it is healthy, is suckled by its dam, and has the appearance, up to the present, of coming to maturity. Within a few hours after its birth, a Bactrian she camel also dropped a calf. The most singular fact is, that both animals dropped similar calves, by the same sire, exactly two years ago.—*E. Stevenson; Secretary, Wombwell's Royal Managerie No.* 1, *March* 29.

The Water and Rock Pipits.—I have often been asked about two pipits found on the south coast, viz., the water pipit (*Anthus aquaticus*, Bechstein; sive *spinoletta*, Linn.), and the rock pipit (*Anthus obscurus*, Keyserling and Blasius). After two years' investigation, I have at last twelve specimens now before me, obtained at various times from Mr. Swaysland, of Brighton—all birds on which I can rely, and taken near this town. I open the books of Mr. Gould, Dr. Bree, Mr. Morris, the 'Zoologist,' Yarrell, &c. &c. Thus armed, I propose to point out how any tyro in Ornithology may distinguish between the two species in their various states of plumage, and thus to clear up the confusion which has so long existed. Mr. Gould, in his magnificent folio on British birds, states that he has compared and identified the Brighton water pipit with the Continental Anthus aquaticus (Bechstein). This, therefore, is so. Our English bird is more common in spring than in autumn. It is a migrant, while A. obscurus is only a partial one. The former arrives early, departs to breed; the latter breeds here, and remains the whole winter. The earliest date of A. aquaticus before me is a male bird, taken at some little distance from the shore on February 19th, 1869, with vinous breast and blue tinge on the back, in breeding plumage even at this early period, just arrived. The last are a pair with dates 17th and 18th of March, 1869, male and female respectively, in the same dress, showing what is true in both species of these Anthidæ—that the male and female can hardly be distinguished except by dissection. By the first week in April every water pipit has left our shores, not to return till the autumn. I have here an autumn specimen, killed October 26th, 1868, near Shoreham. In this bird the vinous breast and prevailing blue tinge of spring and summer are gone. The under parts and the feathers of the vent are pure white; so accordingly is the outer web of the first tail-feather, for the colour of the vent-feathers rules in both species that of the outer tail-feather, which in A. obscurus is at the same date buff. This distinction is not observable in the summer plumage of the two species, concerning the distinctness of which as species I, without hesitation, am positive. The colour of the beak, usually a good diagnostic distinction, fails. I mention this because I have been formerly myself misled by it. But the under part of the throat in A. aquaticus is white in all stages and both sexes, but spotted in A. obscurus. A. obscurus is olive-green, both male and female, in every month of the year, as my specimens prove. The bird is larger and coarser than

A. aquaticus, the spots are much larger and more numerous, the tail-feathers are stouter and longer; while A. aquaticus is smaller and finer, and with a blue tinge on the back and a vinous breast in spring, which colours disappear in autumn, the former being lost, and the latter changed to pure white. I have a series of the eggs of both birds—some of those of A. aquaticus, which are companions of, and came over from the Continent at the same time with, the one figured by Dr. Bree; but no distinction of value can be given, they are so much alike. Doubtless many a water pipit has done duty for a rock pipit, or, being in autumn plumage, has passed for a large meadow pipit, A. pratensis. Dr. Bree mentions that the first primary in Anthus aquaticus is the shortest, which Mr. Pratt, in the 'Zoologist,' p. 9280, correctly points out in A. aquaticus to be the longest. When placed side by side, the distinction between these British birds in all plumages is very apparent; he that runs may read. If the naturalist find a green tinge, he knows that he has a rock pipit; if he observe the blue and red, he sees a water pipit in summer plumage; when he has a white bird, he is sure that it is A. aquaticus in autumn plumage. The two intermingle sometimes on the sea shore; I know instances of such cases. This has caused the confusion. But one is a land bird, the other a frequenter of the sea shore. I do not here give a fresh diagnosis of each species. The measurements can easily be taken from Dr. Bree and Mr. Yarrell.—*Geo. Dawson Rowley, M.A.; 5, Peel Terrace, Brighton, April 5.*

Richard's Pipit.—A specimen of this bird in summer plumage was taken on Clayton Hill, near Brighton, on March 12th, and sold to Pratt, the naturalist, who has mounted it for Mr. Borrer's collection.—*T. W. Wonfor, Hon. Sec. Brighton and Sussex Nat. History Society.*

Meadow Pipits.—Swaysland informs me that since the 19th of February, when he received the first, he has had brought in twelve meadow pipits, all in summer plumage —no two marked in the same way: one, a very large and handsome bird, about twice the size of ordinary specimens, with scarcely a black feather in the breast. He tells me the meadow pipit in winter plumage is often taken to him as the rock pipit —the latter a very uncommon bird on the coast, while the former is comparatively plentiful.—*Id.*

Firecrested Regulus, near St Leonards.—Mr. R. Kent has been good enough to give me the offer of two firecrested wrens this week, killed at St. Leonards—both in the flesh. I was prevented from buying the first, but got the second one for my collection. It was killed on the 9th. I do not know if this species has been got before in the month of April.—*J. H. Gurney, jun.; Bank, Darlington.*

Pied Jay.—A curious variety of the jay, in which the three middle feathers in each wing are white, was obtained by Mr. Druitt, at Oving, near Chichester, on March 14th.—*T. W. Wonfor.*

Migration of Wood Pigeons.—Several observers having recorded, in the 'Zoologist,' the unusually large migration of wood pigeons that has taken place this winter, and as the study of the migration of birds is just now a subject of great interest to the ornithologist, the following observations, made during the present winter at Carshalton, may be interesting to its readers. The wood pigeon is a very common bird in this district, and remains with us the whole year, without any appreciable alteration in its numbers. This winter they have been quite scarce, except when flocks have passed over in their migration. In the month of December flocks, varying in number

from ninety to five hundred, crossed our garden, flying in a S.S.W. direction, at intervals of a few days, the migration taking place, for the most part, in the early part of the day before noon, the birds flying very high. On the 3rd of January an immense flock, probably 6000 or 7000 strong, gathering in stragglers as they flew, crossed our place, coming from the north-east and flying to the south-west. They settled on some tall elms to rest, many of the birds appearing to be tired and exhausted: after resting for a short time they took to wing again. From that day, and for some weeks after, not a pigeon was to be seen in the neighbourhood. Last week, however, a few birds have again appeared about their old haunts.—*A. H. Smee; March* 12, 1869.

Early breeding of Kingfisher.—I sent you two years ago (1867) some notes with regard to the kingfisher, expressing my surprise on discovering that it is such an early breeder. I have now the pleasure of confirming that statement, since the kingfishers are still breeding in the same hole, in a sand-bank which forms the south side of an island in our lake: this year the young ones were on the wing on the 2nd of April; the eggs therefore must have been laid about or soon after the middle of February. Last Friday, April 2nd, one of my gardeners witnessed a most interesting sight: he noticed, from the excitement of the old birds, that something more than common was going on, and, having placed himself very near the nest, partly covered by a piece of broom, he was very soon rewarded by the arrival of the two old birds, which took up their position upon a twig of bramble near the hole, using all their powers of persuasion until they succeeded in inducing one of the young ones to trust itself abroad, when they both accompanied it to a part of the lake which is well sheltered on both sides with trees, and having placed it in safety returned for a second. My belief is, that birds have no knowledge or fear of anything immovable, and that they regarded my man—as long as he was perfectly still, though within a few feet of the hole and but slightly concealed—exactly as they would a tree.—*W. C. Hewitson; Oatlands.*

Redcrested Merganser on the Thames.—I had the good fortune to shoot a fine specimen of the redcrested merganser in Leigh Ray, at the back of Canvey Island, on March 15th. The bird was an adult male, in summer plumage, and was in company with two others: the fishermen told me that they are seldom seen in the river, and none have been shot for some years.—*A. H. Smee; April* 1, 1869.

Bridled Guillemot at Bridlington.—I have, in the flesh, a remarkably small specimen of the bridled guillemot, in winter plumage. It was shot at Bridlington on the 16th of March, by Mr. Jones.—*J. H. Gurney, jun.*

Redthroated Diver.—A redthroated diver, in nearly full summer plumage, was shot by Mr. Guthrie, near Rottingdean, on March 14th: the same gentleman saw, on the 29th, three peregrines fighting over his head high in the air.—*T. W. Wonfor.*

Blackthroated Diver at St. Leonard's.—I have now, to preserve, a beautiful specimen of the blackthroated diver, which was shot by Mr. Cook, at Crowhurst, in a horse-pond close to his house: it is about two years old, and is the finest specimen I have ever seen.—*John Bissenden; Archway, St. Leonard's-on-Sea, Feb.* 21, 1869.

The Great Auk.—I ought to have added, in a postscript to my rough "Notes on the Great Auk," that I trust I have not been interfering with the extended work of Mr. G. D. Rowley, who has long been collecting materials. At page 1641, ninth line from the top, erase the words "in this country."—*J. H. Gurney, jun.; Bank, Darlington.*

Curious Malformation in a Gull's Leg.—Mr. Bond has kindly allowed me to make a drawing of one of the most curious malformations I ever recollect having seen. The bird is the common gull (Larus canus), and the monstrosity consists in the presence of two supplementary toes, attached to the inside of the left leg, exactly at the union of the tibia and tarsus, or at what Professor Macgillivray calls the ankle joint. The usual toes are present, and of the ordinary size and shape—the toes of the two feet exhibiting not the slightest difference. The two supplementary toes are in all respects perfectly formed, the nails as well as the connecting web between them being exact facsimiles of those on the ordinary toes, except that they are on a smaller scale. The drawing is a faithful representation of this curious freak of Nature, and really leaves no opening for farther explanation.—*E. Newman.*

Newts feeding on Frog's Spawn.—I observed to-day, in a garden pond, about half a dozen of the lesser newt (*Lophinus punctatus*), feeding greedily on a mass of frog's spawn: the circumstance of the newt devouring frog's spawn is new to me, and may perhaps be worth recording.—*J. H. Gurney; April* 12, 1869.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

March 15, 1869.—H. W. BATES, Esq., President, in the chair.

Election of Member.

H. Grose Smith, Esq., of Surbiton, was ballotted for, and elected a Member.

Exhibitions, &c.

Mr. Frederick Smith exhibited specimens of Colletes cunicularia, a bee new to this country: they had been sent to him by Mr. Nicholas Cooke, by whose son, Mr. Isaac Cooke, they were captured in the Isle of Wight, between Ventnor and Niton, in May,

1867; four males and five females were taken. It is the largest European species of Colletes, and is the C. hirta of Continental authors, which name, however, must give place to cunicularia of Linnæus, the type of which is extant in the Linnean collection.

Mr. M'Lachlan exhibited a gigantic species of Ephemeridæ, about three inches in expanse of wings. It had been received by Mr. Salvin, from Veragua; and was probably the Palingenia Hecuba of Dr. Hagen.

Mr. Butler exhibited varieties of several butterflies, captured by him in Switzerland, chiefly in the neighbourhood of Chamounix, in July and August, 1868. There were—(1) Anthocharis Cardamines, with the black spot on the fore-wings very small, the black edging confined to the tip of the wing, and the orange colour extending considerably within the black spot—this seemed to be the normal type of the insect in Switzerland; (2) Colias Edusa, remarkable for its large size; (3) Epinephele Janira, one specimen very dark, another very light in colour—the former was the common type in Switzerland; (4) Argynnis Aglaia, with the hind-wings almost entirely black, and the silvery spots on the under side covering the basal and apical parts of the wing; (5) Melitæa Athalia, four varieties, varying from almost entirely black to almost entirely fulvous; and (6) Parnassius Apollo, with small pale ocelli, the ordinary pink markings being pale yellow. Mr. Butler added that Leucophasia Sinapis, the "wood white" as we term it, was common all over Switzerland, not in woods, but in the neighbourhood of water.

Mr. Stainton, who had just returned from Italy, made some remarks on the different habits of the same species in different localities; for instance, at Cannes, Mentone, and other places in the South of Europe, Pyrameis Atalanta was the commonest hybernating butterfly. The species was to be seen everywhere, whilst in this country a hybernated specimen was never seen before April, and rarely before the time when the hawthorn is in blossom.

Mr. Hewitson sent for exhibition a number of butterflies collected in Nicaragua by Mr. Belt; there were twelve species new to Science, and several others which were not previously in Mr. Hewitson's cabinet. The Papilio mentioned at the Meeting of 15th February (S.S. 1607) was believed to be the female of P. Childrenæ, a species distinct from P. Sesostris.

Mr. Hewitson also sent for exhibition two new species of Papilio, from Ecuador, whence they were received by Mr. James Backhouse. As an incident of collecting in Ecuador, it might be mentioned that the captor and his mule were thrown over a precipice together; the gentleman had his head cut and one of his arms broken, and in this plight had to ride for seven days in search of a doctor.

The President exhibited seven forms of Papilio belonging to the Machaon group. Mr. Christopher Ward had purchased the Japanese collection of butterflies from the Paris Exhibition: it included Papilio Machaon and Xuthus, and a third form, which proved to be the P. Xuthulus of Bremer, who described it as being intermediate between the other two; it was first captured in Amoor-land, and the captor took it for a hybrid between Machaon and Xuthus, until it was noticed that its time of appearance was a month earlier than either of the other species. For comparison with these Japanese forms, the President added P. Zelicaon and Asterias, and two other American forms: he observed that in Europe P. Machaon was very constant, and that the allied forms in America exhibited but slight variation from the same type; but in North-Eastern Asia

the group appeared to be more unstable, for although the true Machaon was there found, it was associated with two other forms exhibiting greater divergency from the typical form. This was another instance, analogous to what he had before recorded respecting the Theonoe group of the genus Septalis, in which a certain type of form was found to be constant at the opposite ends of its area of distribution, but was liable to variation in intermediate localities; thus tending to show that the development or manufacture of new species takes place, not necessarily over the whole range of distribution of the particular type, but only in limited areas of the total range, where and when the particular circumstances are most favourable to variation.

A letter from Mr. H. L. Schrader was read by the Secretary; the writer described some of his observations on species of Œceticus, from which he inferred that those species are viviparous.

Papers read.

The following papers were read:—"Descriptions of two New Species of Papilio from Ecuador, and of six New Species of Diurnal Lepidoptera from Nicaragua;" by Mr. Hewitson.

"Contributions to an Insect Fauna of the Amazons (Coleoptera, Prionides)." By the President.

"A Monograph of the Panorpidæ found in Europe and the adjoining Countries; with a Description of a New Species from Japan." By Mr. M'Lachlan.

April 5, 1869.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Royal Society,' No. 109; presented by the Society. 'Journal of the Agricultural Society of England,' 2nd Ser., vol. v., Part 1; by the Society. 'Mittheilungen der Schweizerischen entomologischen Gesellschaft,' vols. 1 and 2; by the Society. 'Studien an Acariden,' Von Edouard Claparède; by Sir John Lubbock, Bart. 'Die Otiorhynchiden s. str. nach den morphologischen Verwandschaftsverhältnissen ihus Hautscelets vergleichend dargestellt von Georg Seidlitz;' by the Author. 'Report on the Culture of the Japanese Silkworm, Bombyx Yamamai, in 1867-8, in England,' by Dr. Wallace; by the Author. 'The Insect Hunter's Year-Book for 1868,' and 'The Zoologist' for April; by the Editor, E. Newman, Esq. 'The Entomologists' Monthly Magazine' for April; by the Editors.

The following addition by purchase was also announced:—Gemminger and Von Harold, 'Catalogus Coleopterorum hucusque descriptorum,' Tom. iii.

Exhibitions, &c.

Mr. Pascoe exhibited a new genus of Diaperinæ from Espiritu Santo, in which the horns on the head between or above the eyes, which distinguish many of the males of Platydema, Diaperis, Hoplocephala, &c., were transferred to the apex of the prothorax; the female showed a slight approach to the same formation. Also species of the European genero Apion, Attelabus, and Elleschus, recently discovered in Australia; and several remarkable unpublished forms of Curculionidæ, among which were—a new genus from Macassar allied to Oxycorynus, having the pronotum distinct from the

flanks of the prothorax, with its edges serrate; a species from Batchian, with the base of the prothorax prolonged into a slender spine extending backwards half the length of the elytra; another from the same island without any claw-joint, its tarsi therefore only three-jointed; a species allied to Catasarcus, with a single claw; a peculiar globose form from Cape York, allied to Tragopus; a thick-set species from South Africa, with the base of its prothorax ensconced in the elytra; a species from Parà, of doubtful affinity, with a distinct pronotum; &c.

Prof. Westwood exhibited a male specimen, from the Oxford Museum, of the Panorpa from Java, which was described at the previous meeting by Mr. M'Lachlan as Panorpa nematogaster. Also specimens of Blatta melanocephala, which was found very destructive in Orchid-houses, feeding on the buds of young shoots.

Mr. Druce exhibited two male specimens of Papilio Zalmoxis, of Hewitson, from Old Calabar.

Mr. Bond exhibited Sciaphila communana, of Herrich-Schæffer, a moth new to Britain, captured at Wicken Fen, Cambridgeshire; also dried larvæ of Myelophila cribrella, *in situ*, within the stems of thistles.

Mr. F. Smith exhibited several species of humble-bees with their respective parasites or cuckoo-bees. Bombus subterraneus varied from yellow to entirely black, and the parasites Apathus camprestis showed the same variations in colour; the same was true of Bombus muscorum, and its parasite. Bombus terrestris was not liable to variation, its parasite Apathus vestalis was also constant; the same was true of Bombus lapidarius and Apathus rupestris, though the parasite in this case had dark wings. Bombus pratorum was the only moss-building species which was infested by a parasite, Apathus barbabellus, and this did not at all resemble the humble-bee. The first idea that suggested itself was that the cuckoo-bee bore resemblance to the worker of the humble-bee in order to gain access to the nest; but it was only in the social species that the parasites resembled the humble-bees, and the parasite of B. patrorum militated against the theory.

In the course of the conversation which ensued, it was suggested that an entry might be effected into the nest of a solitary bee, in the absence of the true owner, without disguise; whilst in the case of a social species, of which some of the colony would always be at home, the entry of an undisguised stranger would be detected. And in reply to inquiries, it was elicited from Mr. Smith that the moss-building Bombus pratorum was a placid bee, by the side of whose nest a person might sit with impunity; and hence it was to be inferred that this species, by reason of its different mental constitution, might more readily admit a stranger into its nest without opposition, whilst stratagem or deception was necessary to obtain access to the nests of species less peaceably disposed.

Papers read.

The following Papers were read:—

"Descriptions of New Species of Diurnal Lepidoptera." By Mr. W. C. Hewitson.

"Notes on Eastern Butterflies." By Mr. A. R. Wallace.

"Descriptions of New Species of Phytophaga, belonging to the Families Cassididæ and Hispidæ." By Mr. J. S. Baly.

"A Revision of the British Species of Homalota." By Dr. Sharp. One hundred and fifty-seven species were described, of which twenty-nine were new.—*J. W. D.*

Notes on the Zoology of Newfoundland.

By HENRY REEKS, Esq., F.L.S., &c.

(Continued from Zool. S. S. 1614).

Letter 2.—ORNITHOLOGY.

Mottled Owl, or *American Screech Owl*, Scops Asio (*Linn.*)—A summer migrant to Newfoundland, and tolerably common. As this is one of the commonest owls in North America, it seems strange that Mr. Downs should not meet with it in Nova Scotia, especially as it frequents the States bordering on the Atlantic more than inland.

American Longeared Owl, Otus Wilsonianus, *Lesson*.—Not common: I only examined one specimen, which was killed near Cow Head. It appears to be a summer migrant.

American Shorteared Owl, Brachyotus Cassini, *Brewer*.—Not common, but I think rather more so than Otus Wilsonianus. It is a summer migrant.

Barred Owl, Syrnium nebulosum (*Forster*).—Apparently a summer migrant, but not common; at least I only obtained one specimen, shot at Cow Head in September, 1866.

Saw-whet Owl, Nyctale acadia (*Gmelin.*)—Not uncommon, and well known to the settlers as the "saw-whet." I only obtained one specimen, which was picked up dead at Cow Head, and appeared to be uninjured. It is a summer migrant.

Sparrow Owl, Nyctale Richardsoni, *Bonap.*—I include this species on the authority of Mr. Downs, who states, in his "Notes on the Land Birds of Nova Scotia," that it is "abundant in Newfoundland;" but, strange to say, I never met with a single specimen, neither were the settlers acquainted with the species: I have very little doubt, however, that it occurs on the island. It is this species which closely resembles the European Nyctea Tengmalmi, but not having specimens I am unable to point out the distinctive characters.

Snowy Owl, Nyctea nivea (*Daudin*). — Tolerably common, and probably remains in Newfoundland throughout the year, although very rarely seen during the summer months, but this may be owing to its following in the wake of its chief prey, the polar hare (*Lepus glacialis*), and ptarmigan (*Lagopus rupestris*), which retire to the high land as soon as the snow partially disappears. The "white owl," as the settlers term this species, is a bold, rapacious bird, and not easily

driven from its slaughtered prey. One of the specimens which I obtained at Cow Head was feeding on an eider duck—probably a wounded bird which it had killed—and was twice knocked over with stones, the last time apparently killed, before it would relinquish the duck: it had, however, sufficient life and strength to force its claws into the arm of the man who picked it up, although protected with all the clothes he usually wore. A large Newfoundland dog, used for retrieving seals, &c., refused to go near this bird after it was knocked down with stones: the men who were present assured me that the bird kept making a "hissing" noise, apparently at the sight of the dog. During my residence in Newfoundland I heard several amusing anecdotes of the snowy owl, but, although I can vouch for the truth of them, it is scarcely necessary to reproduce them all in the pages of the 'Zoologist:" I will, however, relate one or two which I do not think have before appeared in print. William Youngs, of Codroy (Newfoundland), having continually had the bait stolen from one of his fox-traps, determined to watch the trap and shoot the robber: for this purpose he selected a fine moonlight night, with snow on the ground, and, with his gun in his hand, a white swan-skin frock on, and a white handkerchief tied round his cap, he secreted himself in a small bush about twenty yards from his trap, fully determined to shoot the first comer; but his determination proved fruitless, for a large white owl —probably the thief—seeing something white sticking up through the centre of the bush, and evidently mistaking it for a fine plump willow grouse, instantly made a "stoop," and, at the same time, sending its claws almost to the man's brains, suddenly disappeared with the cap and white handkerchief: the man was so startled for the moment that he was unable to shoot at the bird. The snowy owl is a frequent attendant—although generally unnoticed—of the sportsman, and often succeeds in carrying off a grouse or duck before the retriever gets to it. On one occasion some men were waiting in ice "gazes" for the purpose of shooting wild geese (*Bernicla canadensis* and *B. brenta*), when one of them, named James Carter, left his "gaze" to go and have a chat with his neighbour, incautiously leaving his new white swan-skin cuffs and gun behind him. He had scarcely left his "gaze" when an unseen enemy, in the shape of a fine snowy owl, pounced in and succeeded in getting clear off again with both of the white cuffs. A fine adult bird of this species entered my host's house, *via* the chimney, and fought so valiantly for its life that the man had to kill it with a "pew"—a piece of pointed iron fastened to a wooden

handle about four feet long, and used for throwing codfish from the boats. A good many snowy owls are annually caught in the fox-traps of the settlers; and when very fat, which they frequently are, are considered good eating by many, and I see no reason why they should not be so, but I could never sufficiently overcome my repugnance to birds of prey as food to taste one. None of the settlers appeared to know anything of the breeding of this bird, although Mr. Downs states that it "breeds in Newfoundland." Mr. Cordeaux has kindly examined parasites of Nyctea nivea from Newfoundland, and informs me that they are identical with others from European specimens.

Hawk Owl, Surnia ulula (*Linn.*)—Perhaps the commonest owl in Newfoundland, or, from being a day-flying species, is more frequently seen than any other. It is a bold, familiar bird, generally found in the neighbourhood of houses, preying on chicken, tame pigeons, &c., —remaining throughout the year, but not so abundant in the depth of winter as at other seasons. In the fall of the year, and probably at other times, the hawk owl has a habit of perching on the bare and dead top of high fir trees, from which it commands a good view of the immediate neighbourhood, and suddenly drops upon any unfortunate object in the shape of food that may happen to pass within a convenient distance.

PICIDÆ. The Woodpeckers.

Hairy Woodpecker, or *Sapsucker*, Picus villosus, *Linn.*—Tolerably common, and does not migrate. Newfoundland specimens appear to agree with Professor Baird's variety—*medius*.

Downy Woodpecker, or *Sapsucker*, P. pubescens, *Linn.*—Very common, and like the preceding species is non-migratory.

Blackbacked Threetoed Woodpecker, Picoides arcticus (*Swains.*)—This fine species is tolerably common in Newfoundland throughout the year; and often, when the snow is drifting through these dreary forests, no other sign of animal life is noticeable than the "woodpecker tapping" in search of the larvæ of several fine species of Sirex which abound there.

Banded Threetoed Woodpecker, Picoides hirsutus (*Vieill.*)—Scarcely so common as the preceding species, but, like that, is a resident throughout the year: I shot several males, but had a difficulty in getting a female, though I succeeded at last in killing one specimen; it is a rather darker bird than the male, and is without the yellow patch on the crown, having that part spotted with

white. The transverse bands on the back are similar to those on the male.

Black Woodcock, or *Log Cock*, Hylatomus pileatus (*Linn.*)—This is the "great black woodpecker" of the Newfoundland settlers, and appears to be rather rare, as I did not meet with it during my stay there: it is probably a summer migrant.

Flicker, Colaptes auratus (*Linn.*)—This species is a summer visitor to Newfoundland, where it is called the "English Woodpecker," and is tolerably common. It has a peculiar note, which bears a fancied resemblance to that of the green woodpecker (*Picus viridis*); hence the name bestowed on it by the settlers.

Three other species of woodpecker probably occur in Newfoundland, but I did not meet with them, viz., Sphyrapicus varius (*Linn.*), Centurus carolinus (*Linn.*), and Melanerpes erythrocephalus (*Linn.*)

CYPSELIDÆ. The Swifts.

American Chimney Swallow, Chætura pelasgia (*Linn.*)—Apparently rare; at least at Cow Head. I only examined one specimen, shot in June, 1868. It is, of course, a summer migrant.

American Night Hawk, Chordiles popetue (*Vieill.*)—Well known to the settlers as the "night hawk," but I did not meet with a specimen. It is a summer migrant.

ALCEDINIDÆ. The Kingfishers.

Belted Kingfisher, Ceryle alcyon (*Linn.*) — Tolerably common during the summer months, and, like the British species of kingfisher, builds in banks, often at a considerable depth, and lays five or six white eggs. I have always found the belted kingfisher a very shy bird, and difficult to get a shot at.

TYRANNIDÆ. The Tyrant Flycatchers.

King Bird, or *Bee Martin*, Tyrannus carolinensis (*Linn.*)—Visits Newfoundland for nidification, and is tolerably abundant. I have shot them after the first fall of snow in the autumn.

Pewee, Sayornis fuscus (*Gmelin.*)—A summer migrant, but not common.

Wood Pewee, Contopus virens (*Linn.*)—A summer migrant, arriving in May. Not common.

Least Flycatcher, Empidonax minimus, *Baird.*—A single specimen obtained in the month of June, 1868. It is a summer migrant.

Greencrested Flycatcher, Empidonax acadicus (*Gmelin.*)—Not very common; frequents woods in the neighbourhood of houses, and is a summer migrant.

Yellowbellied Flycatcher, Empidonax flaviventris, *Baird.*—Apparently a common summer migrant, arriving in May.

TURDIDÆ. The Thrushes.

Hermit Thrush, T. Pallasi, *Cabanis.*—A common summer visitor, and tolerably good songster: arrives about the middle of May.

Wilson's Thrush, T. fuscescens, *Stephens.*—A summer migrant, but not so common as the preceding species. One specimen obtained in May 1868.

Olivebacked Thrush, T. Swainsoni, *Cab.*—A summer migrant, but scarcely so common as T. Pallasi.

Migratory Thrush, or *American Robin*, T. migratorius, *Linn.* A summer migrant, and by far the commonest of all the Turdidæ. Arrives in April, and soon commences building: I have taken the eggs early in May. This bird is called the "robin" by the English settlers, evidently from its redbreast and familiarity: it is, however, about the size of the fieldfare (*T. pilaris*), and much resembles that bird in habits. The eggs are not quite so large, and of an unspotted blue. A pair of these birds occupied the same nest at Cow Head for six consecutive years. Considering the vast number of "robins" which annually breed in Newfoundland, this habit may account for the scarcity of old nests, so apparent in passing through the thick fir woods.

Blue Bird, Sialia sialis (*Linn.*)—A summer migrant, and said by the settlers to be occasionally common; I did not, however, meet with it.

Rubycrowned Wren, Regulus calendula (*Linn.*)—Not uncommon; arrives in Newfoundland in May.

[*Hydrobata Mexicana*, Bonap.—Has this species really occurred in Nova Scotia? *Vide* Downs on the "Land Birds of Nova Scotia."]

SYLVICOLIDÆ. The Warblers.

American Tit Lark, Anthus ludovicianus (*Gmelin.*)—I do not think this bird breeds in Newfoundland, as I have only seen it in August, or during the autumnal migration.

Black and White Creeper, Mniotilta varia (*Linn.*)—Apparently a common summer migrant.

Maryland Yellowthroat, Geothlypis trichas (*Linn.*)—A summer migrant; common.

Nashville Warbler, Helminthophaga ruficapilla (*Wilson*). — A summer migrant, but apparently rare. One specimen obtained in June, 1868.

Oven Bird, or *Golden-crowned Thrush*, Siurus Aurocapillus (*Linn.*) —A summer migrant, but not common.

Blackthroated Green Warbler, Dendrœca virens (*Gmelin.*)—A summer migrant, and tolerably common, arriving towards the latter end of May.

Yellowrumped Warbler, D. coronata (*Linn.*)—A common summer migrant, arriving early in May.

Baybreasted Warbler, D. castanea. (*Wilson*).—Tolerably common; arrives in Newfoundland early in June.

Chestnut-sided Warbler, D. pennsylvanica (*Linn.*) — Tolerably common throughout the summer.

Blackpoll Warbler, D. striata (*Forster*).—Apparently not uncommon in summer.

Yellow Warbler, D. æstiva (*Gmelin.*)—A common summer migrant, and called by the settlers "yellow-hammer." It makes a pretty little nest in low bushes, somewhat resembling that of our English goldfinch.

Yellow Red-poll Warbler, D. palmarum (*Gmelin.*)—One of the earliest spring migrants, and tolerably common.

Black and Yellow Warbler, Dendrœca maculosa (*Gmelin.*)—Arrives in May, and is tolerably common.

Green Black-cap Flycatcher, Myiodioctes pusillus (*Wilson*).—A summer migrant; arrives in June, but is not very common.

Canada Flycatcher, M. canadensis (*Linn.*)—Arrives in June, but not common.

American Redstart, Setophaga ruticilla (*Linn.*)—A summer migrant, but rare in the north of Newfoundland: it is called "goldfinch" by the English settlers. Arrives about the middle of May.

HIRUNDINIDÆ. The Swallows.

Barn Swallow, Hirundo horreorum, *Barton.* — A rare summer migrant at Cow Head.

Cliff Swallow, H. lunifrons, *Say.*—An equally rare summer migrant with the preceding species.

Whitebellied Swallow, H. bicolor, *Vieill.*—A summer migrant, and very common at Cow Head; in fact, the only species of swallow to be seen there throughout the summer.

Bank Swallow, or *Sand Martin*, Cotyle riparia (*Linn.*)—Very rare at Cow Head, but said to be very common about the Bay of St. George, and further south.

HENRY REEKS.

Thruxton, Andover.

Notes on some of the rarer Birds noticed in Suffolk in 1868. By ALEXANDER CLARK-KENNEDY, Esq.

MAY.

Iceland Falcon.—A good specimen of this rare species was shot by a fisherman near Aldeburgh, at the beginning of this month, as I am informed by my friend Dr. Hele, of that town.

Hawfinch.—May 9. A male hawfinch, which had been kept in a cage for more than a month, was allowed to escape to-day: he had been caught by a boy, with one wing broken, and otherwise hurt, but, under skilful doctoring, he got quite well again.

Yellow Wagtail.—On the 12th I observed a great number of these birds near the village of Snape; they are not common here, although many single birds are seen throughout the summer.

Redshank.—14th. An immense number of these birds were breeding at this date in some marshy ground near Iken and Snape, on the banks of the Alde, a few miles from here: they nest in this locality every year, but I am sorry to say their numbers are rapidly decreasing, as are those of the green plover, common and lesser terns, ringed dotterel, and other birds which breed between Orford and Aldeburgh.

Merlin.—On the 22nd I saw one of these hawks giving chase to a redshank, and several have been killed near Woodbridge this spring.

Quails.—30th. Several quails were seen during the last week at Padworth, in this county, and others near Scole, on the borders of Norfolk and Suffolk.

JUNE.

Greater Spotted Woodpecker.—On the 14th I found a young bird of this species fluttering on the ground near its nest, from which it had probably fallen, in Glemham Park: I could plainly hear the noise made by the rest of the young birds in their nest, and the old bird

flew on to the tree near which I was standing and commenced tapping upon the bark until I left, when she flew away again. A pair were lately seen in the same park.

Lesser Spotted Woodpecker.—16th. Observed a lesser spotted woodpecker climbing a tree in the park, and doubtless it had a nest near, but I was unable to discover its whereabouts.

Bee-eater. *—One of these rare and lovely birds was seen upon a cherry tree by several gardeners, while working in the garden at Glemham Hall, upon one of the early days of the present week. The head-gardener, upon seeing the bird,—which he knew to be very scarce,—ran for his gun, but luckily the wary stranger made good its escape before he returned.

JULY.

Hoopoe.—On the afternoon of the 2nd of this month, while walking across some meadows about a mile from Glemham, I was much surprised to see a hoopoe fly past me, so near as to be able with certainty to recognize the species; indeed I could easily have shot it. A pair have also been observed in the vicinity of Aldeburgh on several occasions last month, and very probably this was one of the same birds.

Swift.—Was last seen on the 30th, near Glemham.

SEPTEMBER.

Kingfishers.—Have received a great addition to their numbers since the summer.

Jack Snipe.—I shot one of these snipe upon the 23rd, and flushed another at the same time, and since that date to the end of the month have killed ten; but the day on which I shot the first bird was most unusually early for the jack snipe to reach this county, although the common species is here in greater or less numbers the whole year round.

Black Tern.—I saw one flying up the river Alde on the 25th.

Redshank.—A pair were shot by a gamekeeper on the 26th, as they flew up from a small pond in the park, which is at least ten miles from the coast.

Stone Curlew.—A pair were killed on Westleton Common early in the month, and Mr. Spalding informed me that he saw one on the same heath last month.

* From my experience of gardeners' Ornithology, I should be inclined to doubt their competency to identify a rare species. In this case their description of colour only might apply to the roller (*Coracias garrula*).—ED.

OCTOBER.

Pied Sparrow.—On the 1st, in a large flock of house sparrows, I noticed one individual with white wings and tail and otherwise pied.

Northern Diver.—One of these divers was disporting himself in the river close to a bridge which spans the Alde at Snape: I wounded him badly, but he managed to escape with a broken leg, at which I was vexed, for the poor creature was probably in great pain: it is a rare bird here, but the redthroated diver often makes its appearance in winter.

Whimbrel.—I observed five on the 2nd, near Iken.

Green Sandpiper.—On the 6th one was seen feeding in a stream near Snape, and since that date I have seen several others in the marshes.

Spotted Rail.—I killed a male upon the 7th as it flew from a reed-bed near Snape, but, being shot with No. 4, it was too much damaged for preservation: I saw two others on the 12th.

Roughlegged Buzzard.—On the 7th one of these buzzards was seen hovering over a pond in which were some tame ducks, near Saxmundham, and as he was swooping down at one of them a man named Hillen shot the bird, which was a finely plumaged male.

Grey Plover.—14th. Several seen on the mud-flats near the river, but very wild and unapproachable.

Osprey.—An osprey was captured by some sailors while in the north sea at the beginning of the month, and was brought to Ipswich, where it seems doing well.

Little Stint.—I shot one out of a flock of four, on the 15th, at Thorpe, near Aldeburgh; and another on the 17th: a friend also killed a third near Thorpe.

Richardson's Skua.—Mr. N. F. Hele shewed me to-day (16th) a fine adult male of this species, which he shot a few weeks ago as it was hovering over the water near to Aldeburgh.

Twites.—Have been more numerous than usual this winter near the coast.

Snow Bunting.—On the morning of the 19th I shot one of these birds, close to the sea; another on the 22nd, and a pair on the 23rd; but these were the earliest birds that were known to have arrived.

Goldeneye.—One has been seen in Thorpe "meer," near Aldeburgh, for several days since the 21st instant.

Ring Ouzel.—In the early part of the present month Mr. T. E.

Gunn, of Norwich, wrote me word that a pied variety of this bird was killed a short time ago in this county; and he stated also that pied flycatchers have also occurred in Suffolk.

Shorteared Owl.—Two were shot near Aldeburgh on the 22nd: since then several others have been seen.

Common Scoter.—A flock of fifteen of these ducks passed close in shore, near Aldeburgh, on the 21st; and I had a long shot at one out of five in the river upon the 28th.

Shieldrake.—27th. A young bird of the year was shot by a fisherman in Thorpe Marsh this morning, and another seen.

NOVEMBER.

Brambling.—I saw the first and only brambling this winter on the 6th instant: it was sitting in a bramble hedge as I passed down a lane.

Black Redstart.—On the 15th I saw a hen of this rare species sitting on a rail in a garden at Darsham: there was no doubt as to the species.

Goldeneye.—On the 13th a friend shot an immature male in the river near Iken, out of a flock of eight young birds; and upon the 17th I reduced the number to six by procuring another. I had often watched this flock, and, by means of an opera-glass, found by repeated daily observations from behind the river bank that they dived continually, but were *never* all under water at the same time, always leaving one bird to keep watch for the others; after a short while (generally about fifty-five seconds) this bird would be relieved by another, who would give the next duck a peck to remind him when it was his turn to take the duty of sentinel.

Yellow Bunting.—18th. A fortnight ago a perfect albino of this species was shot by the head keeper in Glemham Park, but unfortunately was thrown away without being shown to me. [Query, was the keeper competent to determine the species of this albino.—ED.]

House Sparrow.—An albino sparrow was shot during the early part of this month at Woodbridge.

Crossbill.—19th. Several of these birds were lately shot near Melton, Rendlesham and Aldeburgh: some young birds, too, were killed near Thorpe.

Gray Phalarope.—On the 20th one of these rare birds was washed ashore near the Aldeburgh life-boat home, and was picked up by the coastguard.

Common Stork.—A common stork was washed up by the tide near the same place about the 15th, but the man who found it did not know its value, and by the time he had discovered that it was a rare species it was in a state of decomposition.

Knot.—One was shot on the 14th or 15th on the river near Melton.

Redbreasted Merganser.—A male of this species was shot by a punt-gunner, near Woodbridge, on the 20th: this is by no means a common species here, even in the severest weather.

Black Redstart.—On Wednesday, the 25th, as I was returning by the river bank from Orford to Aldeburgh, I shot a male black redstart: it was in excellent plumage, and weighed exactly one ounce. Before killing, I watched it for several minutes: its flight was irregular, the tail being moved quickly from side to side as it flew, and the bird uttered a short note, something like that of the pied wagtail. It never flew for any long distance, generally about thirty yards, and always alighted on the mud by the edge of the water in a small ditch; once it perched on a plank of wood, and commenced running quickly backwards and forwards.

DECEMBER.

Albino Skylark.—I paid a visit to the Woodbridge birdstuffer early in December, and was shown a white skylark, which he has kept in captivity since the spring, when it was captured in a net near Melton: it sings beautifully and is very tame, coming directly to its master's call.*

Brent Goose.—A pair of these geese were observed to fly up the river near Snape, and alight in a pea field, one day towards the end of this month, but they were too wild to allow a near approach.

Whitetailed Eagle.—On the 20th, my friend Dr. C. R. Bree, of Colchester, received one of these rare eagles from Lord Henniker, from Thornham, where it was caught in a trap baited with a rabbit for grey crows.†

Wild Fowl.—A fair number of mallard, teal, widgeon, goldeneye, tufted duck, with a few shieldrake, have appeared in the Alde and Deben; but no rare species, so far as I am aware, have occurred, except one gadwall, which was shot in the beginning of the month.

* Recorded in 'Zoologist' for March, S.S., p. 1699.

† Id. for February, S.S., p. 1558.

Greater Spotted Woodpecker.—Four were killed near Woodbridge early in the month, and two common crossbills.

Parrot Crossbill.—I am informed that a male of this species was shot at Melton lately, but I have not yet seen it.

Goshawk.—One was shot near Bultey on the 24th of last month, and another at Rendlesham early in the present month: a third was procured near Trimley a short time since, but I do not know the precise date.

Longtailed Duck.—Two immature females were shot on the Woodbridge river at the beginning of the month.

ALEXANDER CLARK-KENNEDY.

Little Glemham, Wickham Market,
January, 1869.

About Shells. By CHARLES WRIGHT.*

IN the course of my herborizations in Cuba, I have had frequent occasion to climb trees for flowers which I could not otherwise obtain, and much more frequent occasion to clamber about the limestone cliffs which furnish a great variety of plants, many of which are common in such localities, and are found nowhere else. In these circumstances, it was hardly possible that my attention should not be drawn to the shells, some inhabiting trees, and many more the rocks. I came, in truth, to be very fond of them, spending many hours entirely devoted to shell hunting, which, I begin to think, I could have spent more profitably in my legitimate calling. I propose to relate some of my observations, and to give my views as to the causes of some of the phenomena observed, hoping that they who make this branch of the animal kingdom a special study, may be prompted to investigate these phenomena more minutely than I had time or ability to do.

Shells have a season of hybernation in hot climates as well as in cold; but, in the former, the cause of their inactivity is dryness; in the latter, low temperature. If the drought be protracted, the greater part seek a retreat where some degree of moisture prevails; for example, in the ground or among the dead leaves covering it; in a hollow tree or in the crevices of the bark; under stones or among the leaves of epiphitic Tillandsias. But occasionally an individual is

* From the 'American Naturalist,' February, 1869.

found abroad at this season, and repeated examination led me to discover *a* reason for it; whether it is *the* reason, may remain for wiser ones to determine. These shells are commonly stuck fast where they are found, or glued as it were, and not merely adhering as in a time of rest in the wet season. And they have all been injured,—the shell more or less broken. Are they going to die? Are they undergoing repairs? This last seemed to me more probable. They *are* always, in part at least, grown together, not quite symmetrically often, but generally quite firmly. Do they eat by night as in the rainy season? This I cannot assert. The firmness of their attachment would indicate that they do not. So uniform has been my experience in this case, that now, if I see an Achatina, or a large Helicina, on a tree in the dry season, however inviting they may appear at a distance, I pass them by as worthless.

Oleacina and its allies are carnivorous snails. They have a smooth polished delicate shell, yet possess the power to capture and devour others many times larger than themselves, besides being protected by a firm shell, and with a closely fitting hard operculum. Not unfrequently we find large shells like Helicina regina, or H. sagræana, quietly submitting to be devoured by an Oleacina, which it has the strength to walk off with, as easily as a tortoise could carry away a mouse. Wherein lies their great strength? I can offer a suggestion. I have often been in such situations on the face of a vertical cliff, that I needed both hands for support. At such times, if a shell attracted my attention, I used to put it between my lips till I reached a place where both hands were free. Thus I learned that the watery or slimy secretion which all these animals emit, in the case of this group, is bitter, and in the larger species very decidedly so. I can hardly doubt that the secret of the power which these snails possess is to be sought here. May not this bitterness produce a benumbing effect on their prey? I have discovered a like bitterness in no other shell, and I have collected many species in this way, using my mouth as a temporary box.

Proserpina has a shell of like delicate structure as that of Oleacina. Once I found one in close contact with a Melaniella. This, together with its structure, led me to suspect that it, too, is carnivorous. Who knows? Will an examination of the tongue tell? Will some one try it? I once amused myself capsizing these little fellows, and if they did not manifest real anger, there was a very good imitation of it. Turned on its back, it lashed its tail about violently for a snail; or,

I might say, it behaved mulishly and kicked,—the organ thus forcibly used being called the foot, I believe. The inverted position seemed a painful or disagreeable one.

I hesitate to record an observation repeatedly made on account of the apparent improbability of the fact, and the difficulty of explaining it. Individuals of some species of shells many times vary greatly in size as well as in colour. In other species, the said variations are slight. In one or more species of Cyclostoma of this latter kind, I have often found young individuals considerably larger than any fully grown. There could be no shadow of a doubt that these were all of the same species, and not two distinct ones living together. Among a dozen or two fully formed shells and others nearly grown, all agreeing well in size, one, perhaps two or more, incomplete individuals would occur, so much larger than all the rest, as to suggest the question,—*Why do we not find finished shells of this larger size?*

Two solutions of this question have presented themselves as possible, though neither of them is quite satisfactory. One is, that the animal has power to absorb its shell and reconstruct it of a smaller size. The other, which seems more probable, is, that these overgrown individuals are abnormal, deformed, and never come to perfection. Thus, being thin and fragile, they soon crumble and disappear. I have thought that I found proof or evidence that mollusks *have* power to absorb and reform the shell. From Melania and Paludina, which are viviparous, I used to preserve the young found in the process of cleaning the shells. Observing that they were quite blunt at the apex, and that somehow in their growth toward maturity they became sharp-pointed, I could in no other way account for this than by supposing that they absorbed the shell, and reconstructed it after a smaller pattern. I will admit, for what it is worth, the possibility of inaccuracy in my observations when comparing small things with great. Thus, a very short cone might appear blunt, while, if increased tenfold, the bluntness would be, relatively, quite little. Yet this view does not satisfy me, and I still think my first impressions were correct. Will not some one by accurate measurements settle this question?

On the beach to the eastward of Matanzas the habits of a Cyclostoma struck me as noteworthy. A hundred yards or more from the shore, the ridge formed of sand and broken shells is overgrown with various trees and bushes, which this shell ascends probably to feed on some lichen. But if the tree leaned at any considerable angle, say

twenty-five or thirty degrees, no shell could be found on it. And of the bushes, too, it had its choice as to size, also. None seemed to venture up a bush, or there was no attraction for them, if it were not larger than the finger or thumb. It may very well be, that on the small bushes they found nothing to eat; but the same reason cannot be given for their refusal to ascend larger leaning ones.

It has been said above that, in winter, shells mostly lie dormant, not on account of the cold, but of the dryness. But if, at this season, a heavy shower occurs, which is not very unusual, they come out of their hiding places and appear to be feeding; not, indeed, in such numbers as during the summer, for already many are dead. Now, let a norther, which is a drying wind, spring up, and they haste away to their retreats with all possible speed. Such a shower occurred on a winter night when I was in the neighbourhood of Guane, where there are excellent rocks for shells, and many and various shells among the rocks. Early in the morning I found some specimens of Melaniella Pichardi. They were not abundant, though I saved a considerable number, and was desirous of collecting more of them, as it is by no means common. While I was at breakfast, a light norther began blowing; I made but little stay, and returned to the rocks, in hopes, though not confident, of finding more: not one was to be seen, however. Similar effects are produced by a norther on other shells. Just at night I have observed Cyclostoma salebrosum, in numbers, on rocks where, in the morning, if a norther prevailed during the night, not one could be found but by searching among the leaves at the base of the rocks. This shell, with some others,—as Cycl. rotundatum and Cycl. undatum,—have a way of letting go and rolling to the bottom of the rock if it be inclined (and they seem to prefer such), when they see the hand approaching; and this, apparently, when they have not even *one* eye open: it would seem as if they felt the approach of danger.

A group of Cyclostomas,—C. claudicans, *Poey*, C. assimile, *Gundl.*, C. tenebrosum, *Mor.*, and perhaps others,—spin a thread by which they hang from the lower side of projecting rocks. When the weather clears after a rain, numbers may be found thus at rest, particularly in the early summer, when the young abound. Whether they can haul in their line I am unable to say, but guess they cannot; for many are found with the border broken, which could hardly be so common, unless caused by a fall from some height. If in this position they fall, it must sometimes be a distance of fifty, or, it may be hundreds of

feet. These are all thin, delicate shells; and the power of suspension seems as if designed for their injury or destruction.

Helix stigmatica, and its allies, live under stones or among dead leaves: they are dull in colour, and the most of them small in size. H. stigmatica is never found fairly in the daylight. Once only, if I rightly remember, I found an individual which had just turned the corner of the rock under which it lived. Why do they not come out to the light, and what do they live upon in their dark retreats? Another group, of similar habits, comprises Helix Titanica, H. pulcherrima and others. These have longitudinal lines of bristles, or rather stiff hairs, which are quite conspicuous in the young shell, but diminish, wear away, or quite disappear with age.

Shells often cease growing for a time, so far at least as relates to their calcareous covering. Their growth is interrupted during the dry season, and it may also be by an unusually dry time in summer. In banded shells, when the growth is resumed, the pattern of their markings is often, perhaps always, changed. The bands may be moved to the right or left, or be divided into two, or two may be united, or a colour may be suppressed, or a new one introduced, or any one colour may be widened or narrowed. In Helix picta, *Born.*, the variety of markings is almost innumerable. While the animal remained quiescent as a whole, why did not the several parts retain their relative positions? The colour-secreting glands must have changed in position.

The wide diffusion of some species, and the extremely limited area in which others are found, excite in the inquiring mind a desire to know the causes of this unequal distribution. Helix regina in several forms is found in the whole of the mountain range of the western part of the island. Helicina adspersa is another extensively diffused species, besides being very variable in size and markings. On the other hand, Cyclostoma foveatum has been found only in one locality, at the base of a high projecting cliff, in considerable numbers, but all dead; nor is it known where it lives. I have looked upwards from below, and have climbed to the top and looked downwards in vain. Not more than two or three have been obtained in a moribund state, —a single one only with sufficient life to enable Gundlach to describe and figure the animal. A few square yards contain all we know of this species. Achatina fasciata is found from one end of the island to the other, and at all elevations above the sea, under several forms which have been described as distinct species. Helix picta, *Born.*,

is another widely diffused shell, and extremely variable in colour and size. I have observed many young in the top branches of a high tree just felled, on the very top of the mountains, in Yateras. It seems to be a high climber, which may account for its comparative rarity, fully grown and alive. I have met with very few.

Cylindrella is largely represented in Cuba, more than eighty species being enumerated in the latest catalogue. Most of the species are extremely local; several, so far as is now known, being restricted to localities of a few yards square, or to a few rods. Doubtless other localities will be discovered for many of them. A few, as C. Poeyana, C. elegans and C. irrorata, are much more widely spread, but probably not one extends through the whole island as does Achatina fasciata. But what is most noteworthy is the remarkable tenacity of life possessed by many species. Some have lived for months, and even years; and, unless closely confined, they will crawl forth on the return of warm, damp spells of weather, getting into the wrong boxes and creating sad confusion.

A Contribution towards the Life-history of Cecidomyia persicariæ, Linn. By ALBERT MÜLLER, Esq.

THE eggs of the spring generation of this midge are laid in the months of April and May by females which have hybernated in their cocoons in the larval state, in small batches of from three to ten, on the under margins of the leaves of Polygonum amphibium, *Linn.* (*var.* terrestre). They are pale orange, oblong, rounded off at both ends, and piled one against the other in a recumbent position, in a similar way to that in which we see small pebbles settled down in the beds of rapidly-flowing brooks: the larvæ hatch after a day or two, according to the weather; they are then almost transparent, and of a very pale hue; their shape elongated and depressed. As they are getting older they assume the well-known shape of nearly all Cecidomyian larvæ; the body slightly truncated behind, increases in breadth towards the middle and tapers gradually to a point; their colour is now orange, and remains so for the whole term of their larval life. At first they are rather lively when disturbed, but their rapid growth soon renders them obese and more or less helpless. Under the influence of their irritating action,* the inhabited leaf-margins

gradually assume the form of rolls, curling downwards towards the midrib of the leaf, the substance of which becomes bloated, and, as the accumulation of sap increases, the irritated part turns yellow, then orange, and, in parts exposed to the sun, crimson-red.

When the larvæ are full grown, which happens a fortnight or three weeks after birth, according to the weather, (showery, warm days promoting their development greatly), they *spin* within the leaf-roll a white, opaque and rather strong silken cocoon, cigar-shaped and tapering to an obtuse point at both ends. Several of these cocoons may often be seen attached to each other longitudinally: this operation finished, the insect, after a few days outward repose, rids itself of the larval skin and appears as a sculptured pupa, the colour of which changes from a pale amber hue into the following mature condition: the length is somewhat less than half the size of the larva; the head, eyes, feeler-, palpi-, wing- and leg-cases jet-black and shining; the thorax polished dark brown; the abdomen beneath of a dirty yellow; the anal segment, viewed from above, is dark brown; the next two segments dirty yellow; the following four are all dark brown; the eighth and ninth segments dirty yellow.

After a lapse of from twelve to sixteen days (reckoning from the date of the shedding of the larval skin), the pupa, ready to emerge, by means of a very slight tooth placed on each side just above the base of the feeler-cases, cuts a lateral opening through the cocoon, at or near the spot where the cocoon's upper end begins to taper off, and by a series of progressive movements wriggles itself out far enough to give the upper part of its body free play, whilst the abdominal segments remain fixed within the cocoon: the thoracical part of the pupal envelope begins to split longitudinally through efforts from within; gradually the head, with its appendages, the wings and legs, are drawn out of their separate cases, and the whole insect with a shuffling movement forward glides out, leaving the transparent pupal skin projecting from the cocoon. It is noteworthy that the feeler-cases are now standing clear of the thorax, whilst, like all other limbs, they were, during the pupal state, soldered more or less to the body. After a few minutes the imago discharges a small quantity of a milk-white fluid, and the limpness of its whole organisation compels it now to take a few hours rest, which it passes with its wings at first slightly raised and afterwards folded flat on the back. During this period

* I believe this action to be a kind of licking, not sucking, as has been suggested.

the head and thorax are dark brown, the orange body gradually grows darker too, the antennæ assume their characteristic curved position, and at last the insect appears in its well-known garb, which I need not further describe. Copulation, lasting only a few minutes, takes place soon afterwards; the smaller male, easily recognizable by his antennæ being about the length of the body (whilst those of the female are only half the length of her's), seeking his more sluggish partner with vibrating wings, and as quickly leaving her again. The abdomen of the impregnated female, after a few hours' interval, swells to an enormous extent; her ovipositor now becomes visible and far protruded, and she betakes herself to the under side of the Polygonum leaf, there to deposit her eggs in the manner indicated above.

The number of females is far greater than that of the males. The average duration of the perfect insect's life in captivity is not more than three or four days.

For the opportunity of making many of these observations I am indebted to my friend Mr. H. W. Kidd, of Godalming, who in October last sent me a quantity of the cocoons to look after during his absence from home: I immediately damped the Polygonum leaves slightly, then gradually removed the cocoons into some damp sand under a bell-glass, and what precedes is the result of this little trouble. I would, therefore, recommend to all observers who work at these Diptera to try a plan similar to my own; and if, in consequence of the suggestion I now throw out, it should fall to our lot to have to record elsewhere a good many observations by other gentlemen on the natural history of other gall gnats, I shall feel still greater pleasure than I did in carrying my own experiment to the end detailed in the present paper.

ALBERT MÜLLER.

Penge, May 1869.

Collected Observations on British Reptiles.

By EDWARD NEWMAN.

(Continued from S. S. 1665.)

Subclass 2. METAMORPHOTIC REPTILES.

No mistake can be greater, or less in accordance with the true principles of scientific arrangement, than to raise the Metamorphotic Reptiles to the rank of a class, while the desmogenous fishes, gymno-

genous birds and marsupial sucklers are allowed to remain integral portions of the classes to which they respectively belong. The different mode of reproduction obtains equally in each of the four classes of endosteate animals; and whether we are classifying Sucklers, Birds, Reptiles or Fishes, we must accept it in all, or reject it in all. The great character by which the Metamorphotic Reptiles are separated from the Immutable Reptiles is, as the name implies, the presence of a complete metamorphosis; and although the full value and weight must be allowed to this important distinction, we should never forget that a precisely similar discrepancy obtains in the other classes. This distinctive law, however, is not absolute; indeed, like every other strongly marked character, it is liable to important exceptions. The salamander, for instance, produces its young alive, sometimes taking to the water with this object, but generally seeking some moist, mossy retreat, or the damp flooring of a stone crevice or cavern, where the humidity of the surrounding atmosphere and objects affords the necessary conditions: when the young are produced in an ungenial site in this respect they quickly perish. I believe this viviparous parturition of the salamander is invariable, in this respect differing from that of Lacerta agilis, in which I regard it as exceptional only. The first notice of the phenomenon that I met with was communicated to me by Mr. Samuel Gurney, so favourably known to naturalists by his successful experiments in breeding salmon, rearing black swans, &c. The following is Mr. Gurney's record made at the time.

"Whilst staying at Dresden for a few days last year, in the month of July, we took an excursion to Thorant, a picturesque little village and watering place, a few miles distant. It was a splendid evening, after a very showery morning. Whilst walking through a wood I found two salamanders, which I took back with me to Dresden, and put them in a small box which I procured for the purpose. We went out for a three days' excursion into Saxon Switzerland, leaving them on the window-sill: on our return I found one of them dead (from the box having been exposed to the heat of the sun), and the other nearly so: it, however, soon revived on being sprinkled with water, and it was our *compagnon de voyage* till our return home, where I left it for some months in a glass fish-bowl, with some mould and moss, which was kept slightly moist. My gardener used occasionally to give it a worm, though it seemed to thrive just as well without being fed. I presented it to the Zoological Gardens in January; a few days afterwards it

produced some young ones, and, in the course of a week or so, it had brought forth thirty-two, most of which soon died, but six of them survived nearly a fortnight."—*Zool.* 2789.

The loss of the little ones was, doubtless, consequent on the ignorance of the keeper as to the viviparous character of parturition; and the absence of all provision for the unexpected event. Had the salamander in question been provided with water, or thoroughly wetted moss, in all probability her little ones would have survived. Great doubts have been expressed as to this exception of the salamanders being a solitary one, and instances have been reported of toads proving viviparous in cellars where access to water was impossible; but these reports, as far I have been able to investigate them, turn out to be unsatisfactory: in some instances the reporters are anonymous; in others pseudonymous; in others, where a real name and address has been given, access to the writers has been found difficult; and finally, in those cases where the reporter has been found trustworthy, the conditions have not been scrutinised with that care which such statements require. In one particular instance, in which there could be no doubt as to the good faith of the reporter, the marvel, for such it was deemed, was diminished very considerably by two collateral circumstances:—*first*, it was exactly at the time of year when the ordinary migration of minute toads commonly takes place; and, *secondly*, access to the cellar was very easy, and almost inevitable, by means of some steep stone steps leading from a large and unwalled garden, an arrangement which would render the descent to this *Avernus* remarkably *facilis* for the juvenile travellers, should any be passing in that direction, and after the first tumble their fate would be sealed, for *revocare gradum*, that is to reascend the steps, *hic labor hoc opus est*—would indeed have been a task all but impossible.

All the Metamorphotic Reptiles shed their skins once at least in the year, some of them oftener, and all without exception swallow their cast-off clothing I wish to lay stress on this last named fact, inasmuch as the detailed descriptions of the process given by various authors in regard to the toad, without mentioning natterjacks, frogs, salamanders or newts, would, I think, fairly lead to the inference that the phenomenon was peculiar to the toad. This is by no means the case, and our not regarding this propensity as general and characteristic of the subclass arises simply from the lack of observations, not from the absence of the character. The most graphic description

of this ecdysis in the toad is from the pen of Mr. William Turner: I transcribe it entire.

"I have a small house under my care for growing cucumbers; there is a bed in the middle of it, and the soil is about three feet high from the ground (*i. e.* to the top of the hills where the plants are in); a person, therefore, standing in the house can examine an object placed on the hill with ease. Last Saturday, about seven o'clock, a.m., I uncovered the house and went in to see that all was right, when, to my surprise, I saw my pet companion, a fine toad, apparently in the agonies of death. It was seated at the end of the hill of soil; its mouth, or rather under jaw, opened every few seconds (the top jaw did not move), the eyes shut, and the body violently convulsed each time the jaw opened; and with each convulsion of the body the right fore foot was raised to the head: I placed myself in front of it, and perceived it was drawing something into its mouth each time the jaw moved; at that instant the right eye opened; it then inflated the body on the left side and drew in the right, placing at the same time the left fore-foot on the head behind the eye, and drawing it down to the mouth; it next appeared to hold its foot in its mouth for about a second, which it then drew out, and I distinctly saw the three points of skin that came off its toes outside its lips, till the next opening of the jaw, when they were drawn into the mouth. When it drew its foot over its left eye (which before was shut) it broke out as bright as ever. Some folds of the skin adhered to the left leg, but by two or three motions of the jaw they were gone, and in about a minute the skin was drawn off the lips: the toad had eaten its own skin, and there it stood with its new covering as bright as if it had been fresh varnished. I endeavoured to touch it to feel if it was clammy, but the creature gave a vigorous jump and the soil adhered to its legs: I looked at it an hour afterwards, but it had begun to assume its dingy brown colour. The time it took to get off its head-dress was only a few minutes: it appeared to me that each time its jaw opened, it drew the skin forward, while it distended the body on the side to be uncovered."—*Zool.* 2855.

Mr. Bell, in a communication made to the Zoological Club of the Linnean Society, and also in his 'British Reptiles,' not only gives a very similar account, but adds such interesting particulars that I need make no apology for extracting the narrative:—

"Having often found, amongst several toads which I was then keeping for the purpose of observing their habits, some of brighter

colours than usual, and with the surface moist and very smooth, I had supposed that this appearance might have depended upon the state of the animal's health, or the influence of some peculiarity in one or other of its functions: on watching carefully, however, I one day observed a large one, the skin of which was particularly dry and dull in its colours, with a bright streak down the mesial line of the back: and on examining further I discovered a corresponding line along the belly: this proved to arise from an entire slit in the old cuticle, which exposed to view the new and brighter skin underneath. Finding, therefore, what was about to happen, I watched the whole detail of this curious process. I soon observed that the two halves of the skin, thus completely divided, continued to recede further and further from the centre, and become folded and rugose; and after a short space, by means of the continued twitching of the animal's body, it was brought down in folds on the sides. The hinder leg, first on one side and then on the other, was brought forward under the arm, which was pressed down upon it: and on the hinder limb being withdrawn, its cuticle was left inverted under the arm, and that of the anterior extremity was now loosened, and at length drawn off by the assistance of the mouth. The whole cuticle was thus detached, and was now pushed by the two hands into the mouth in a little ball, and swallowed at a single gulp."—*Bell's 'British Reptiles,'* p. 120 of the Second Edition.

This phenomenon has also been observed, as before stated, in the natterjack, frog, salamander, and both the common species of newt, so that we must conclude it is a law throughout the Metamorphotic Reptiles.

A third and most interesting distinction between the Immutable and Metamorphotic Reptiles is to be found in the existence of a highly poisonous viscid fluid which exudes through pores in the skin: this fluid is secreted by follicular glands seated under the skin almost over the whole of the dorsal area, and is emitted at the will of the animal; but whether from fear or anger it is impossible to say. I find some very imperfect observations on the properties of this secretion in the 'Philosophical Transactions' for 1826, by Dr. John Davy, who concludes that it is innocuous: this assumption, however, is erroneous. The earliest tangible experiments with this poison were made by two French philosophers, Gratiolet and S. Cloez, who by inoculating various animals with the cutaneous fluid of toads and salamanders, have demonstrated that it is endowed with well-marked

and exceedingly dangerous qualities. The first experiment of these gentlemen was performed on a little African tortoise, which was inoculated with some of the toad poison in one of its hinder feet: paralysis of the limb supervened, and still existed at the expiration of eight months, thus demonstrating the possibility of local poisoning by this agent. In order to determine whether the poisonous material was deteriorated by keeping, the two gentlemen procured about twenty-nine grains of the poison on the 25th of April, 1851, and having laid it aside until the 16th of March, 1852, they inoculated a goldfinch with a small portion: the bird almost immediately died. Subsequently the investigators succeeded in eliminating the poisonous principle from the inert matters with which it is associated in the skin pustules, and they found that when thus purified its effects were much more intense. Linnets were subjected to its influence and died in about six minutes after inoculation; they were not convulsed, but opened their beaks, and staggered as if inebriated; they soon closed their eyes, and finally fell down dead. Subsequently the experimentalists inoculated a dog and a goat with the poison, and found that it caused death in less than an hour. M. Vulpian performed similar experiments with the poison of the toad and natterjack, on dogs and guinea-pigs, and found that they died in periods varying from an hour to an hour and a half. The poison is also effective on frogs, killing them within an hour, and acting equally well by merely applying it to the surface without puncturing the skin of the frog; but on toads themselves it has never been observed to have any effect whatever. One instance has been recorded of its fatal effect on a human being, and this so interesting and so important that I shall quote it here. "A young lad, ten years of age, named Louis P——, whose parents are small tradespeople in the Faubourg Saint-Antoine, at Paris, was playing with some of his companions near Bercy, not far from a building in the course of demolition. This boy, who was of a delicate constitution, had a slight abrasion on the skin of the right hand: having seen a lizard run into a hole in an old wall, he put in his hand, but instead of the lizard he drew out an enormous toad, which he immediately threw on the ground. The skin of the toad is covered with large tubercles formed by an aggregation of small pustules open at their summit: a milky liquid, of a yellowish-white colour, very thick and of a fetid odour, escapes from these tubercles when the animal is irritated. Whilst the lad had the animal in his hand, this liquid, which is a virulent poison, was introduced through

the wound in his hand into the blood: he was soon after seized with vertigo, vomitings and faintings, and was carried to the house of his parents, who called in a doctor immediately; but already the malady had made such progress, that in spite of the most energetic means employed, the patient soon died." These experiments are recorded in an English dress in the 'Zoologist' for 1852, at p. 3658, or in Mr. Cooke's work on 'Our British Reptiles,' p. 116: they prove in a most satisfactory manner that Metamorphotic Reptiles secrete a virulent poison, and experience shows us that an instinctive knowledge of its existence is protective to the animals themselves, since cats almost invariably avoid contact with frogs, toads or newts, and dogs absolutely refuse to attack them; and if pertinaciously incited to worry a frog or toad, a dog will be observed to froth at the mouth and exhibit every symptom of abhorrence and disgust. In this there is something very remarkable and worthy of admiration, for, of all created beings, the Metamorphotic Reptiles are the most innocuous and defenceless; and were they not protected by the innate knowledge possessed by carnivorous animals of this poisonous property, they must inevitably perish, and thus a useful race of insectivorous animals would be utterly exterminated. Like most of the known strong organic poisons, the active principle of toad venom is alkaline in its character, almost insoluble in water, slightly soluble in ether, and very soluble in alcohol. My correspondent, Professor Moquin Tandon, in his 'Medical Zoology,' describes this secretion as "a thick viscid milky fluid with a slight yellow tint and poisonous odour,"—the latter expression I do not fully appreciate,—and adds that "it has a disagreeable caustic bitter taste: it becomes solid on exposure to air, and assumes the form of scales when placed on glass."

In the arrangement of memoranda, which have been many years in the course of collection, it would have been satisfactory to have followed some safe guide as to the classification of the species, but there is none. Even so lately as in the January number of this periodical it was shown that one of the principal orders in our artificial methods is composed of the larvæ of species belonging to a totally different group (see Zool. S. S., p. 1569), a discovery which, while it destroys our received conclusions, opens up a world of conjectures: it shows us that such genera as Siredon, for instance, consist of larvæ which have the power of propagating their kind, and thus that an unascertained number of generations may pass away before a single individual

has arrived at perfection! What, then, is the test of maturity? We are, as it were, still on the very threshold of knowledge as regards these creatures, and they may possibly pass away before we have entered even the vestibule of the temple.

It is clear that the Metamorphotic Reptiles exactly correspond with the Batrachians of Cuvier, and his divisions Les Grenouilles (*Rana*) and Les Salamandres (*Salamandra*) must be accepted under the names of Ranidæ or Frogs and Toads, and Salamandridæ or Newts. They are distinguished by the simple and very convenient character of possessing or not possessing a tail in the perfect state.

Order I. or Family I. FROGS and TOADS (RANIDÆ).

Have no tail when arrived at maturity.

Genus BUFO.

Skin dry, warty: no teeth, either palatal or maxillary.

THE NATTERJACK (*Bufo viridis*).

Natterjack Toad, Goldenback, Walking Toad, Mephitic Toad.

Bufo viridis, *Dumeril* and *Bibron*, vol. viii., p. 681; *Clermont, Quadrupeds and Reptiles of Europe*, p. 253.

Bufo variabilis, *Schinz, Europ. Faun.*, vol. ii., p. 74.

Bufo Calamita, *Jenyns, Brit. Vert.*, p. 302. *Bell, British Reptiles*, p. 126.

Bufo viridis, *Buon. Faun. Ital.*, and Bufo Calamita, *Buon. Faun. Ital.*, figured as two distinct species.

A word as to the name. In the 'Penny Cyclopedia,' article "Toad," there is the following note on this subject:—"Bufo Calamita, *Laur*, recorded as a distinct species by the Prince of Canino ("Fauna Italica" and "Amphibia Europea"), is considered by MM. Dumeril and Bibron as identical with Bufo viridis." My friend Mr. W. R. Tate writes me thus:—"I think Bufo viridis is only a variety of Bufo Calamita: I possessed a German specimen some time ago, and it differed only from the Natterjack in being of a more decidedly green colour, and in having the dorsal stripe very faint. In the number of toes, formation and mode of progression it was identical with B. Calamita, and it emitted the same sulphurous scent when handled." Two varieties are of frequent occurrence on Blackheath,—one of them decidedly greener than the other,—but I cannot accept them as species, although I

believe there is no other distinction between the Prince of Canino's species. I adopt Dumeril and Bibron's name in deference to their high authority, but am not satisfied which of the names, "viridis" or "Calamita," has the claim of priority.

The Natterjack has no teeth, either palatal or maxillary: the tongue is rounded at the tip: the eyes are prominent and brilliant: the skin is dry and covered with depressed warts, which are coarse and irregular on the back, finer and more uniform on the belly: the male has a vocal bladder on each side of the neck, invisible except in the act of croaking, but there is a protuberance behind the eye that possibly has some connection with this vocal apparatus; the legs are short; the fore feet, each of which has four toes, are turned inwards; the third toe is longer than the rest, the others are nearly equal in length; the hind legs are longer than the fore legs, but are not formed for leaping; they have five toes, of which the fourth is decidedly the longest, and the third next; the first and second are nearly equal; the toes are connected, at the base only, by a membrane. The colour is either olive-brown approaching to green, or ochreous-brown, the warts and a somewhat triangular patch behind the eye being brick-red; the belly is whitish or yellowish, and is generally spotted with dull black: the under side of the hind thighs is also pale, and indistinctly barred with black. The contrast between the colour of the back and belly is very marked, and the paler colour of the belly often ascends the sides, but without much regularity.

The food of the Natterjack consists entirely of living creatures: but little care is displayed in the selection of these—woodlice, bees, beetles, flies, moths, caterpillars, slugs and worms, seem equally acceptable: the only required condition I have observed is that the food must be living. I have repeatedly but vainly tried to tempt the Natterjack in confinement with a plump and smooth caterpillar as green as grass, previously killed with hot water; but all to no purpose; yet he would always most willingly take a buzzing fly from between my finger and thumb. The mode of feeding on a small object is by touching it with the tongue, to which it seems to adhere and to be drawn into the mouth immediately, but a worm is seized by the middle-and in spite of every effort to escape is eventually swallowed.

The Natterjack breeds late in the spring, or indeed when spring is almost turning into summer; I have repeatedly found them in the water depositing their spawn as late as the 15th of May: the eggs are

small, blackish, and connected together in a double series by a glutinous thread, like beads on a couple of parallel strings: in no instance have I found masses of spawn like those deposited by the frog, and with which we are so familiar. I have always found the breeding places of the Natterjack to be shallow pools on open sandy heaths; indeed, they seem to prefer to have the water so shallow that they can keep the mouth and nose exposed while they are still resting on the bottom. Having discovered such a resort, I have always fished it with my water-beetle net, and after the water has drained off I have found the double-beaded strings of Natterjack spawn crossing in all directions the cheesecloth of which the net is made. In warm weather the eggs are hatched in a few days, and the tadpoles retain that state for many weeks: in 1848 I possessed tadpoles of the Natterjack still unchanged on the 12th of October, as stated in the 'Zoologist' (Zool. 2305). I made a series of drawings of the tadpoles in all their stages, but these present no material difference from those of the toad, or even of the frog, except in their less size and darker colour. They appear to feed entirely on decomposing matter, and I have no doubt that, in conjunction with the tadpoles of frogs and toads, they act beneficially as scavengers and purifyers, devouring all decaying substances that may chance to come in their way. I have seen them congregated by thousands about the carcase of a drowned dog, and on one occasion I obtained about half a pint of these little creatures from such a situation with one sweep of the net. Their metamorphosis usually takes place about the beginning of September, and the young Natterjacks are excessively small, but in no period of their final state, however small they may be, is there any difficulty in recognising the mediodorsal stripe which serves as their distinctive characteristic: as soon as their transformation is complete they leave the water for a time, but remain on the very brink, forming a living belt round the sinuous margin: immediately on being disturbed they scuttle back into the water, diving at once to the bottom, and remaining out of sight until the supposed danger has passed. Whatever the danger, however pressing the emergency, and whatever his stature, the Natterjack never demeans himself by adopting the hopping mode of progression so derogatory to dignity in the common toad. The baby Natterjacks remain round the margins of their native pools for a month or more, only returning to the water on occasions, and during this period they seem to have very little opportunity of tasting food. At this period the amphibious character of Metamorphotic Reptiles is

fully exhibited, for, whilst their babyhood lasts, an exposure to the air seems necessary for maturing the newly acquired organs of aerial respiration, and a frequent dip in the water equally essential to prevent the too rapid absorption of the old organs. The period of probation lasts about fourteen days, and after it has expired the first soaking shower is the signal for migration; they then leave the scene of their babyhood and scatter themselves in all directions. A perilous period is this with every species of frog or toad. Birds, lizards, mice and rats seem to regard these migrations as a provision for their welfare—a kind of manna falling in the wilderness for their especial benefit, and without waiting for invitation they hasten to the welcome feast.

On the approach of winter the little Natterjacks secrete themselves under stones or stacks of turf, and pass the colder months in abstemious sleep; but no sooner has the sun regained some power than the little fellows again seek the water, and remain in its vicinity so long as summer lasts, always seeming to regard water as a haven of refuge and hastening into it on the apprehension of danger.

Until the arrival of autumn, the Natterjacks, being then twelve months old, continue to be strictly diurnal animals, delighting to bask in the sun and indulging in constant diurnal ablutions, but on arriving at their full growth they become nocturnal, remaining concealed in subterranean galleries by day and venturing abroad only by night; still their taste for bathing continues. M. Julian Deby tells us, in the 'Zoologist,' that during their nocturnal rambles in search of the wandering members of the invertebrate world, they habitually indulge in a cold bath, and while enjoying this luxury they croak incessantly, "making night horrible." I have often heard this nocturnal serenade, but never detected the musicians: my friend Mr. Tate has been more fortunate: he says, "After dark, or at least after the rising of the moon, I was returning home across Wisley Heath, and, when near a pond, something ran quickly across the path. I took it up and saw by its bright vertebral stripe, showing clearly in the moonlight, that it was a Natterjack. I therefore commenced looking round the pond, and caught no less than fifty-seven of them. The noise they were making was very great; their croak being hoarse and one continued note, instead of, as in the common toad and frog, a succession of short notes. The Natterjacks showed more sense than the toads, by leaving off croaking and squatting close to the ground to escape observation whenever I approached one of their haunts, while the toads kept croaking and hopping. I found them always in shallow water in

which they can sit with their heads out, and, as their name (calamita) implies, among reeds very often. I see now why their eyes are so much brighter by night than by day, as they are evidently nocturnal in their habits; but until this time I had always caught them on hot, sunny days going about the heath in pairs."—'*Science Gossip*,' i. 111.

I scarcely agree with my friend in his conclusion that their bright eyes indicate nocturnal habits, or indeed that the species is nocturnal at all until perfectly mature; for the first year of its existence it is most decidedly a lover of the sunshine.

The peculiar scent of the Natterjack has been observed by all naturalists: Shaw calls it mephitic; Lord Clermont speaks of it as a strong sulphury odour; Roesel says the smell resembles that of orpiment or arsenic in a state of evaporation; this author also connects this smell with the poisonous exudation, and tells us that it can eject the fluid to a distance of three or four feet, and that if the poison fall on any part of a room where the creature is kept the scent will be perceived for two months afterwards. These statements I have never verified.

The appearance of a Natterjack when at rest is almost exactly similar to that of a toad; the only striking difference is in the presence of the mediodorsal stripe, but no sooner does the creature commence action than a manifest discrepancy is observable: the toad progresses by a series of short and apparently laborious jumps, at each descent falling flat on its belly; the Natterjack's mode of progression resembles that of a huge spider, being a rapid run, and the belly being kept clear of the ground: in this run it continually stops, also like a spider, as if to rest. I have never seen the creature make the slightest attempt to jump. I have paid great attention to these interesting animals ever since the year 1826, when I first observed them on Blackheath: in 1841 I brought some from that locality to my little garden at Peckham, where they soon established themselves in subterranean galleries, which they occupied for many years; every night they made predacious excursions, and were frequently detected wending their way home some hours after daylight, when they were very apt to be picked up and handled by the children, into whom no wholesome fear of fire and poison-spitting on the part of frogs and toads had ever been instilled: it is certainly an unwonted sight to see a little girl of two years of age taking up a huge toad or a natterjack, and fondling him as a very nice playfellow.

The Natterjack is common on the Continent of Europe, in Germany, Poland, the South of France, Switzerland and Russia, and Lord Clermont adds the West of Asia and the North of Africa. In England it occurs at Gamlingay in Cambridgeshire, King's Lynn in Norfolk, Wisley Heath, Putney Heath, Wimbledon Common, and many other localities in Surrey, Blackheath in Kent, and probably in other counties; in Scotland it has been found abundant on the coasts of Solway Firth; and in Ireland it is equally abundant on the southern slopes of Macgillicuddy's Reeks, in the Killarney district. I supposed this a discovery of my own in 1839, but found from the late Dr. Mackay that he had published the fact three years previously in the 'Magazine of Natural History.'

Mr. Cooke records a superstitious belief at King's Lynn, in Norfolk, respecting the Natterjack. "One of these toads is to be obtained and buried in an ant's nest, where it is to be left for some time. When the flesh is all cleared off by the ants, and the skeleton is quite clean, the shoulder bones are to be taken off and thrown into a running stream. One of these bones will float with the current, whilst the other will float against it. The latter bone must be secured, and, if kept as a talisman, will confer on its possessor supernatural power."

EDWARD NEWMAN.

(To be continued.)

Otter in Suffolk.—A fine otter was shot on the 5th March, in the vicinity of Oulton Broad, whilst basking on the stump of an old tree.—*T. E. Gunn, Norwich.*

Mouse or Spider.—In this month's number of your 'British Moths,' when noticing C. Perspicillaris, you say—"There are two records of this moth in England—one at Yarmouth, and the second (a wing only) at Ashford, in Kent: the latter is said to have been found in a spider's web." This reminds me of the old controversy, Spider or Mouse, and adds another spoke in the wheel in favour of my opinions in that controversy; and I firmly believe that two men were never more mistaken than Messrs. Doubleday and Newman in that matter. I feel that I am but a minnow attacking tritons, but you must recollect that neither of you ever attempted to overcome the difficulty of bats feeding on butterflies: the fact alone of almost all the wings found at Looe being butterflies, convinces me that bats had nothing to do with the matter.—*Stephen Clogg.*

Musk Rat (Sorex cærulescens) *and Frog.*—At Jaunpùr, N. W. Province, India, on the 22nd October, 1861, I was coming out of my room at 4 a.m., when I heard a cry of distress outside; it sounded something like the noise made by a frog when in pain. It was still dark, so, taking a hand-candlestick, I went to the grass whence the

sound proceeded: here I found a frog making feeble attempts at escape, hopping and crawling short distances, and every time he stopped a musk-rat rushed at him and gave him a bite, on which he cried out; he was evidently getting weaker and weaker. Undeterred by my presence, this went on till they reached my bath-room door, when the musk rat, seeing me, made a bolt into a small drain, and so escaped me. I examined the frog, and found that he had been bitten in many places and was very weak: had I not come, the musk rat would undoubtedly have made a feast on him. Again, as to the insect-feeding of the musk rat. On the evening of June 28th, 1861, as we were sitting in our drawing-room at Jaunpùr, we had placed the large lamp on a small round table nearly in the corner of the room, away from us, on account of the swarms of insects which were attracted by the light. These insects, at least many of them, fell to the ground against the corner wall, and as I was watching them for specimens, a fine musk rat appeared, and amused himself and us by catching them and eating them: he stood on his hind legs to reach up the wall, which the grasshopper and other insects were endeavouring to climb up, and even jumped at them every now and then. This scene was repeated several nights. I believe the reason that musk rats are so fond of frequenting bath-rooms is on account of the frogs often found there, and the foregoing incident confirms the idea; although, as a rule, this animal may be held to be an insect feeder.—*C. Horne, B. C. S.*

Ornithological Notes from South Devon. Little Gull.—One of these birds was caught in Torbay on the 14th of January. Another was shot in the same locality a few weeks later. Both these birds were brought to Mr. Shopland, the naturalist, in Tor (Torquay), in the flesh to be stuffed, where I saw the one first named.

Pintailed Duck.—These ducks have been very numerous this winter, and especially in January, in the neighbourhood of Torquay.

Early Nesting of the Robin.—A robin's nest was found on the 7th of January, in Smale's Nursery Garden, Torquay.

Variety of the Sparrow.—In the beginning of January I saw, near the Torquay Harbour, a male sparrow with the primaries of a pure white.

Common Scoter.—On the 17th of February two of these birds were shot in Torbay.

Cream-coloured variety of Chaffinch.—In the early part of February a chaffinch, entirely cream-coloured, with the usual white bands on the wings, was brought to Mr. Shopland, the naturalist in Tor, to be stuffed, where I had an opportunity of seeing it.

Cinereous Shearwater.—One of these fine birds was shot near Berry Head in February. The bird swam up to the boat so daringly that it had to be driven off some yards, in order that in shooting the bird it might not be blown to pieces.

Mountain Finches.—A pair of these beautiful finches was shot in the neighbourhood of Paignton in February. They are of rare occurrence in South Devon.

Gannets and Redthroated Divers.—These birds were shot in considerable numbers this winter in Torbay. Mr. Shopland had no less than fifteen gannets for stuffing at one time.

Abundance of Goldcrests and Wrens.—Great numbers of these birds have been observed in this neighbourhood.

Early Nesting of the Missel Thrush.—A nest containing four eggs was discovered near Torquay on the 6th of March.

Swallows.—Swallows were observed in this town for the first time on the 10th of April.

Cuckoo.—This bird was first heard on the 11th of April.

Early Singing of Warblers.—The chiffchaff, willow warbler, blackcap and tree pipit were heard singing on the 11th of April.—*A. de Hügel; Florian, Torquay, April* 17, 1869.

Osprey in Norfolk.—A fine bird (probably a male) was shot near one of the broads in this county last September.—*T. E. Gunn; Norwich.*

Early nesting of the Barn Owl in Norfolk.—An unusual instance of the early nesting of the barn owl has recently come under my notice. On the 26th of February a nest of two fresh-laid eggs was taken from an old ash tree at Ketteringham, by a lad, who also caught the old bird whilst sitting.—*Id.*

Ring Ousel at Muswell Hill.—On the 10th of April a man in this neighbourhood shot a specimen of the ring ousel; it was in company with the male bird: they were both feeding on some grass-land between Highgate and Muswell Hill: both birds were seen two days before, and the male continued near the spot until the 12th of April. Not having heard of the occurrence of this bird so near London before, I have taken the liberty of sending you this short notice.—*Walter Smith; North Lodge, Muswell Hill*, 13*th April*, 1869.

Cirl Buntings and Crossbills in Devonshire.—In March I received for preservation a beautiful pair of cirl buntings, male and female: they were shot during the earlier part of the month at Knightsbridge, in Devonshire. I also received information of the capture of several crossbills about the same time, in the same neighbourhood.—*T. E. Gunn; Norwich.*

Crossbills in Surrey.—During the middle of February a flock of crossbills, consisting of one male and six females, were seen on some firs at Foxwarren, near Cobham, some of which were killed and sent me for preservation.—*Id.*

Name of a Finch.—I shall be much obliged if you will be so good as enlighten me as to the species of the bird of which the following is a description: it was shot yesterday near a farmhouse at Mayfield, having been observed in the garden for a day or two previous feeding on groundsel. The bill indicates that it belongs to the bunting family: the length of the bird, from the tip of the bill to the tip of the tail, is five inches and three lines; forehead, crown, cheeks and throat, bright ultra-marine; space between the bill and the eye black; back, tail coverts, breast and under parts, bright greenish blue, changing in different lights, of precisely the same tints and varying hue as the tail-coverts of the common kingfisher; primaries brown; the outer web of the fourth white; the outer web of the greater wing-coverts blue; the inner, which is seen but little when the wings are closed, black; tail dark brown, the outer edge of the central feathers tinged with blue. The bird was in very good condition: I have preserved it.—*H. T. Murdoch Kirby; Mayfield Rectory, Hurst Green, Sussex, April* 14, 1869.

[As well as I can make out the description, I think the bird is the "Nonpareil Finch," a native of parts of South America: they are frequently brought to this country, and live very well in the aviaries of the "Zoo." I know of no other species that answer in any way your query. There can be no doubt that the bird is an escaped specimen.—*F. Bond to E. Newman.*]

Hoopoes at the Land's End District.—I have seen no less than four of these beautiful birds in the flesh during the last week. It is much to be regretted that every example of this beautiful bird should be persecuted to death whenever they appear, especially as the occurrence of more or less every spring may be regarded as a certainty.—*Edward Hearle Rodd; Penzance, April* 20, 1869.

Cuckoo in Confinement.—A cuckoo, caught last June or July, whilst being fed by a pair of yellow wagtails, has been kept caged through the winter: I saw it this morning alive and well; it sometimes indulges in a sort of laugh, somewhat like that of a parrot, but has never yet cuckoo'd.—*Egbert D. Hamel, Bole Hall, Tamworth, April* 15, 1869.

Curious Malformed Beaks of the Woodpigeon and Ringed Plover.—On the 18th of February a female woodpigeon was shot at Rackheath, near Norwich, which presented an unusual growth of bill in both mandibles. The upper mandible was at least three quarters of an inch longer than the lower one, and gradually arched throughout its length. A few days since I received some ringed plovers from Yarmouth: the upper mandible of the bill of one projected beyond the tip of the lower to some extent.—*T. E. Gunn; Norwich, March*, 1869.

Vitality of a Turkey.—The Norwich papers of the 6th of February last contained an account of a turkey that had remained for thirty-eight or forty days without food. A game dealer of this city had some turkeys which were placed for the night in a cellar that was a sort of general receptacle; next morning the birds were taken out, with the exception of one that had imprisoned itself behind a couple of barrels: this when discovered was still alive, although in a very emaciated condition; it died two days afterwards, partly, it is supposed, from exposure to cold.—*Id.*

Contents of a Heron's Crop.—On Thursday last, the 25th, two male herons (Ardea cinerea) arrived from Norfolk at Mr. Swayland's, naturalist, to be stuffed. I was curious to ascertain the last dinner of these unusually fine birds. The first had stowed away in his œsophagus eleven perch, some of them five inches long, regardless of the sharp dorsal fin of that species: one of them has been preserved as a memento. The other heron had regaled himself with a nice little pike of eighteen inches in length, setting some formidable teeth at defiance; inside the pike again was another fish half digested, which appeared to me to be a roach of some five inches. The pike apparently had not long bolted his prey before "a long-winged heron great Minerva sent," but not with good omen. The roach in his turn had feasted on something; but, having followed the subject from its ardeine commencement, I here let it drop, as it was becoming rather nasty, though I believe it might have been pursued, according to what philosophers call the "sequence of events," somewhat further.—*Geo. Dawson Rowley; 5, Peel Terrace, Brighton, March* 27, 1869.

Purple Sandpiper in Suffolk.—A beautiful male of the purple sandpiper was shot at Gunton, near Lowestoft, on the 10th of November last: weight two ounces.—*T. E. Gunn; Norwich.*

Solitary Snipe near Norwich.—During last autumn a fine male bird was shot in this neighbourhood.—*Id.*

Sabine's Snipe (?) *at Christchurch.*—We have just had brought us a very good specimen of black snipe, which proves to be a female.—*W. Hart & Son; West End, Christchurch, Hants, March* 30, 1869.

Velvet Scoter in Norfolk.—A fine adult male was shot at Hunstanton on the 12th

of February; it weighed 3 lbs. 6 oz. The stomach contained fragments of shells of small whelks, including four nearly entire.—*T. E. Gunn; Norwich.*

The Seasonal Plumage of the Divers (*Colymbidæ*).—I examined a very fine great northern diver a few days since, which was captured in a net in Megavissey Bay, and brought here alive: the nuptial plumage was very nearly perfected, but the head was intermixed with gray feathers which were rapidly giving way to the black feathers, on raising which the feathers were cropping up in every direction. There can be no doubt that the speckled plumage and the throat marks of the Colymbidæ are a seasonal livery, although the fact of several examples being seen in the autumn every now and then in this state of plumage, gives reason for thinking that after a certain age the summer plumage is retained perennially by old birds.—*Edward Hearle Rodd; Penzance, April* 30, 1869.

Dates of Arrival of Spring Visitors at or near Great Cotes, North Lincolnshire.—March 6th, Pied Wagtail. April 8th, Wheatear; 10th, Chimney Swallow; 12th, Yellow Wagtail, Tree Pipit and Willow Wren; 14th, Cuckoo; 15th, Sand Martin; 21st, Whinchat; 22nd, Whitethroat. May 2nd, Sedge Warbler; 4th, Swift; 7th, Garden Warbler. House Martin and Spotted Flycatcher, none seen up to this date. The Common Sandpiper arrived about the 22nd of April, but I failed to make a note of the exact day.—*John Cordeaux, Great Cotes, Ulceby.*

Curious position of Nest of Water Hen.—On April 23rd, as my brother and I were walking through the stack-yard of Stoughton Grange, we saw, in a small horse-pond, a male and female water hen and young sitting on some wood in the water: as we were watching the parent birds enticing their young out of sight under a stack of wood, and seeing the tiny black chicks scrambling over the wood, a young one suddenly dropped down violently from above with such force that it went several inches under water, partly stunning itself; quickly recovering, it paddled merrily away towards its parents, who were loudly calling: as we were extricating it from the wood, another dropped from above in like manner; looking up, we saw the nest on a tree stump overgrown with ivy, about twenty-five feet above the water, with three or four black little heads peeping out, and one or two newly-hatched young scrambling about the trunk, and presently another tumbled down: they could have been only a few hours hatched, and were quite unsuspicious of danger, as they swam directly to us and let us catch them without fear. I have known many of the nests built in trees, but none so high up; and it is curious that the young tumbled into the water of their own accord, on hearing the cry of their parents. Last year, in the planting just by, there was a nest of water hens in an elder tree, at a considerable distance from any water.—*Theodore C. Walker; Woodside, Leicester.*

Anecdote of Owls.—Last summer I got a young barn owl in the downy state from a gamekeeper, and about the same time an adult brown or tawny owl, which was winged, but injured so little that it could fly: I kept it to hear it hoot in the winter nights, but not a hoot could I make it utter. The white owl was always very tame, and as he got fledged he became a most entertaining pet: his cry was at first a kind of squeaking or wheezing noise, exactly like the noise of the stocking looms which are used in this part: this noise was uttered occasionally all day when young and hungry, but at night he was very clamorous: during the winter this noise ceased altogether,—the only cry he then uttered was a pleasing and very low whimper when he flew to meet me: he was exceedingly tame, in fact too tame, for on going to feed him at

night he would fly to meet me, often knocking the candle out of my hand and settling on my shoulder, whimpering and pretending to bite; but often in settling on my head, my cap slipping off, he would stick his sharp claws into my ear, causing me to utter a very undignified squall. He had a most odd way of wriggling his head about from side to side, and up and down, and being so very tame we took him out in the garden, where he did not offer to fly away. One day my brother took him in the garden in the evening, when he flew straight off and could not be recovered: three days after, at seven o'clock in the morning, he came to my brother's bed-room window and knocked and flapped against the glass, when he caught it, but how he found his way back among so many houses I cannot imagine. The tawny owl, being an adult bird, never was so tame, but by kind treatment it let one put one's finger in its mouth, ruffle its feathers up and pull it about without anger, occasionally snapping its beak when extra-excited: it would never let any one see it feeding, and lived on good terms with the white owl and the kestrel hawks: on its first admission the white owl flew at it, and they dug their claws into each other's feet and screeched, but the tawny owl gaining the mastery; they ever after lived very amicably together: with the exception of that one screech and the usual snapping of its bill, I never heard it utter a sound.—*Theodore C. Walker.*

The Green Lizard at Torquay.—Having read in Mr. Newman's interesting article on British Reptiles in the 'Zoologist' for April (S.S. 1619) that the green lizard (*Lacerta viridis*) is of doubtful occurrence in Great Britain, I have the pleasure of sending to you for inspection a lizard which I suppose to be the above-named animal, together with the following data concerning it. It was brought to Mr. Shopland, the naturalist at Torre (Torquay), having been captured on the Rock Walk in the same town in July, 1860, in which locality several have been caught (two of which are in the Museum of Natural History in this town), and their occurrence is vaguely accounted for by their having been placed there by a gentleman many years ago. It was kept in confinement for four or five months by the same man. When alive its colours were far brighter, its back being of a vivid green shading off into dull yellow. I bought the specimen of Mr. Shopland, and should be much obliged if, on returning it, you will give me your opinion concerning it.—*A. de Hügel; Torquay.*

[I believe the specimen courteously sent for my inspection to be one of Lacerta viridis, but the distinguishing colour has entirely faded, and its place is supplied by a uniform olive-green. After the very candid manner in which Baron de Hügel has expressed his doubts as to the claim of this specimen to be considered indigenous I need add no opinion of my own.—*E. N.*]

Early Appearance of Reptiles.—I see in the 'Zoologist' for March (S. S. 1593), you have commenced "Observations on British Reptiles," so perhaps it may not be uninteresting to you to know that, on the 13th of February, I saw two blind-worms basking in the sun, and that on touching them with my stick they immediately started off with as much activity as they usually show during the warmer months of the year. On the following Thursday (the 18th) I saw and killed, near the same spot, an adder of about the average length; it had apparently recently shed its skin, as it was the most vivid in colouring I ever saw, and perfectly active in its movements. On the same day, and also at the same spot where I saw the first blind-worms, there was another, or rather part of another, for on taking it up I found that on some former

occasion it had thrown off its tail, and that a (to me) very remarkable process was going on in the repairing of the injury: about an inch of the skin appeared to have lost its vitality, but still adhered to the body, forming a case of the natural size of the reptile: on looking into it the end, or tail, appeared to be perfectly sound, but whether it would have grown to its former length is more than I can assert. A newspaper paragraph stated that two full-grown adders had been killed near Fowey, about nine miles from this place, a week before I fell in with the one I killed.—*Stephen Clogg; East Looe, March* 2, 1869.

Scyllarus arctus in Berry.—By the kindness of Humphry Davy, Esq., of this place, I have obtained Scyllarus arctus alive and in berry: it was taken in a crab-pot at Long Rock, near this place, and its capture establishes beyond all doubt that this Mediterranean crustacean breeds in Mount's Bay. It is the second specimen taken in the Bay alive to my knowledge, but the first I ever saw living. It was taken off the same rocks on which Dr. Borlase (*vide* his 'Natural History of Cornwall,' p. 274) found that fine shrimp "Squilla lata Rondeletii." It is impossible now to ascertain whether Dr. Borlase was quite correct in the name of his specimen, but looking at the fact that we have taken Scyllarus arctus in the same locality as his "shrimp," and to the fact that Pennant (vol. iv., p. 17, lobster 23) identifies "Sq. lata Rondel." with his "Homarus arctus," and describes the latter as "Size of the spring lobster," it is probable that the doctor was mistaken and that his specimen was S. arctus also.—*Thomas Cornish; Penzance, April* 23, 1869.

Note on the Phosphorescence of the Lobster after Death.—I have just been reading Phipson on Phosphorescence, a work which is I believe held to be an authority on the subject. In Part 3 he treats of emission of light by dead animal matter; but he does not allude to the common lobster as an instance of this. On April the 24th I purchased at Norwood a lobster, which had been boiled on the previous afternoon, and which was therefore perfectly fresh. On April the 25th, in the afternoon, the said lobster was cut up and put in the dish in the usual manner for the table; it was then stowed away in the larder, which is a cool airy place, where the thermometer at the time stood at about 56° Fahr.: in the evening, the cook having gone out, the table-servant went to the larder in the dark to bring it to table; she was startled by what she thought to be the pair of eyes of a cat which had stolen into the larder; on looking more attentively she saw that it was the lobster shining in the dish. She brought it to table and left it, whilst she announced supper: meanwhile a member of the family going into the dark room saw the lobster shining in the dish, and called us all in. The dry shell of the crustacean did not shine at all, but all the moist interior, as also the juice in the dish. This latter was so luminous that a drop taken on the finger shone, as also when let fall on the table-cloth. Every moist part of the creature appeared to be luminous, and the luminous portion presented an oily feeling. I do not attribute much importance to this last fact, as this juice always, more or less, presents a similar appearance. Of course, on a light being brought in, the phosphorescence could not be observed; but in the dark it was very brilliant, and I have thought it worthy of a note.—*C. Horne; Upper Norwood, April* 26, 1869.

P.S.—All appearance of phosphorescence had vanished next morning, as I tested by placing the remains in a dark cellar. I believe that a free current of air greatly

enhances the collection of phosphoric matter, if it be such. My fishmonger tells me that most sea-fish become thus luminous, many of them within half an hour after dark, and others at a later date. Notes on this subject from others of your correspondents, who living at the seaside have a better opportunity of observing, would be very interesting.—*C. H.*

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

May 3, 1869.—H. W. BATES, Esq., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Royal Society,' No. 110; presented by the Society. 'Journal of the Quekett Microscopical Club,' No. 6; by the Club. 'Annales de la Société Linnéenne de Lyon,' vol. xvi.; by the Society. 'Verhandlungen der k. k. zool-bot. Gesellschaft in Wien,' vol. xviii., Parts 1 and 2; by the Society. 'Bulletin de la Société Imp. des Naturalistes de Moscou,' 1868, No. 2; by the Society. 'Beitrag zur Kenntniss der Coleopteren-Fauna der Balearen,' by Dr. Schaufuss. Hewitson's 'Exotic Butterflies,' Part 70; by W. W. Saunders, Esq. 'The Zoologist' for May; by the Editor. 'The Entomologist's Monthly Magazine' for May; by the Editor.

Election of Member.

Charles Owen Waterhouse, Esq., of the British Museum, was ballotted for, and elected a Member.

Exhibitions, &c.

Mr. S. Stevens exhibited a large collection of Coleoptera, sent from China by Mr. Pullinger; and read an extract from a Report on the Coffee Plantations of India, to the effect that the planters had not discovered any remedy for or preventive of the ravages of the coffee-borer, Xylotrechus quadripes.

Mr. Dunning exhibited a specimen of the common Cetonia aurata, found in a garden at New Cross on the 11th April; it was partly covered with earth, and appeared to have just emerged from its underground hybernaculum, whence it had been prematurely tempted by the first warmth of spring.

Mr. Butler mentioned that the Conocephalus from West Africa, which he exhibited on the 15th February was still alive; he had kept it in a box on a mantelshelf at the British Museum, where it remained motionless unless disturbed, and had not eaten anything whatever.

Prof. Westwood exhibited three species of Epyris and some other Hymenoptera of doubtful position, having relations with the Proctotrupidæ, the Chrysididæ, and some of the Scoliidæ; and a Calyoza from Port Natal, with pectinate antennæ having thirteen joints in both sexes; this was identical with an insect found in gum animé, and described in Trans. Ent. Soc. ii. 56 (where the male was represented as having only twelve joints to the antennæ).

Mr. Frederick Smith exhibited both sexes of Cynips, the male of which had at last been detected by Mr. Walsh in America. The oak-apples on the black oak (Quercus tinctoria) are first observed in May, and reach their full growth in a few

weeks; by the middle of June, male and female gall-flies (Cynips quercus-spongifica, *Osten-Sacken*) emerge from a small proportion of them, say one-fourth; the remaining three-fourths do not develop flies until the autumn, and then produce gall-flies (C. q. aciculata) closely allied to, yet quite distinct from, those produced in June, and out of thousands of the autumnal flies which were examined not one was a male. Mr. Walsh placed some of the autumnal form (C. q. aciculata) on oak-trees, and they created galls, from some of which were obtained the spring form (C. q. spongifica), whilst a few produced the autumnal form (C. q. aciculata), and all the latter were females. These last again were placed on isolated oaks, galls were formed by their puncturing, and from these the spring form (C. q. spongifica) was again obtained. From which observations it was to be inferred that the two forms are not distinct species, but dimorphous forms of the same species. From the red oak (Quercus inanis) a different gall was obtained, smaller than the former, and the central cell not woody: from these galls came male and female gall-flies (Cynips quercus-inanis, *Osten-Sacken*), which were undistinguishable from the spring form of C. q. spongifica, but no autumnal form of this fly had been discovered. Mr. Walsh felt himself compelled to consider the flies distinct, because the galls were different and were obtained from distinct species of oak; but the gall-flies were exactly alike. An account of Mr. Walsh's observations had been given in "The American Entomologist," of which Mr. Smith mentioned that, though 6000 copies were struck off, the early numbers were already out of print.

Mr. Charles Horne stated the result of his observations in India on various insects, as regards their liability to or freedom from the attacks of animals, birds, lizards, &c. In corroboration of his previous statement (S. S. 1648) he might mention that the brown or yellow bear (Ursus isabellinus) was described by Dr. Jerdon as eating scorpions, insects, honey and fruit; the Himalayan black bear (U. Tibetanus) was very fond of locusts, but with this exception did not affect insects; the black bear (U. labiatus) was said to "suck the grubs of large Longicorns" in the Neilgherries, having first dug them out of the soil, but this bear was not found among the hills of the North-West Provinces, and Mr. Horne was not personally acquainted with its habits. Anthia quadrimaculata, all the species of Blaps, and all the observed Mylabridæ and Geotrupidæ, were refused by everything. A brightly coloured locust was refused by birds and lizards; it exuded a yellow acrid juice with a pungent odour. The wingless female Lampyridæ were not eaten, though perhaps the males might be. Small round hard Coleoptera, and Mantispæ, were refused by the Gecko lizards, which were otherwise omnivorous. Termites in all their stages, and migratory locusts, were generally eaten by birds, frogs and lizards; even the smallest birds would take locusts, as would also squirrels and mice. Hemiptera were generally refused. Mantidæ were freely eaten by birds. Merops viridis and other birds eat bees; the honey-buzzard tears off the comb of bees and wasps, and heedless of their stings sits and eats the honey, wax, grubs, and all. Crows eat all visible caterpillars, but prefer smooth-bodied ones. King-crows (Dicrurus) eat all insects on the wing; a large fat-bodied moth with red under-wings was a great favourite with them. Sparrows delight in the Noctuidæ; so do the hunting spiders, and Mr. Horne was at a loss to understand why the spiders were not carried off by the moths. Most of the thrush tribe gobble up almost indiscriminately every insect or caterpillar they find. Sparrows had been seen to refuse cockroaches, but other birds would eat them. Most of the Blattidæ were

rejected by birds. The Ichneumonidæ appeared to enjoy immunity from the attacks of birds, which Mr. Horne attributed chiefly to an acrid smell which most of them emitted. He had seen Dytiscidæ taken by birds, and dropped from inability to eat them. Iulidæ were totally rejected by all animals and birds.

Mr. Horne also mentioned that he had once known a large spider (or rather a Galeodes) killed by the sting of a wasp upon which he was feeding; the Galeodes finished his meal, but sickened and died shortly after. He inquired whether it was from fear, or for the purpose of annoyance, that humble-bees eject fluid when disturbed; and mentioned a similar occurrence which he observed in a hornet at Benares: the hornet was on a window, and, on being touched with a pencil, ejected a clear fluid along the glass, in several lines of from one inch to two inches in length. Mr. Horne also exhibited a sketch from nature of a moth and a hunting spider: the moth was at rest on a small bamboo in a summer-house, and the spider was quietly feeding upon the moth; the question was, how did the spider catch and hold the moth, without any disturbance of the latter? The moth must have been alive when the spider seized him, for the spider would not have cared to suck a dead body.

Mr. M'Lachlan had seen a Phalangium which had captured, and held in captivity, a Plusia Gamma under similar circumstances.

Mr. M'Lachlan exhibited a white ant which had been brought in all its stages by Mr. Melliss from St. Helena. (See Proc. Ent. Soc. 1863, p. 185; 1866, p. xii.) The insect was said to have been introduced into the island from the coast of Africa, but it was not referable to any described African species; it had rather the appearance of a West Indian or Brazilian species, and resembled the Termes tenuis of Dr. Hagen.

Mr. M'Lachlan also exhibited a number of black Poduræ, probably the same species as that exhibited by Mr. G. S. Saunders (Proc. Ent. Soc. 1867, p. lxxxv), the Anura tuberculata of Templeton: the so-called "blight" fell over a duck-pond and farm-yard near Hungerford on the 10th April, and looked just as if a sack of soot had been emptied out; it floated for some time on the pond, but soon disappeared from the farm-yard. Mr. M'Lachlan added that he had only that morning found a number of small white Poduræ in his own house at Lewisham: some flowers were in a room, one of the flower-pots had been removed, leaving a saucer containing water, on the top of which the spring-tails were floating; but on returning two or three hours later they were all drowned.

Prof. Westwood suggested that they must have passed from the flower-pot into the water before the removal of the former; and Mr. Jenner Weir said that during the present spring he had observed them on several occasions under flower-pots.

Papers read.

The following papers were read:—

"Notes on Eastern Butterflies," (Continuation, on the genus Diadema); by Mr. Alfred R. Wallace.

"Descriptions of new or little-known Forms of Diurnal Lepidoptera;" by Mr. A. G. Butler.

New Part of 'Transactions.'

The first part of the "Transactions for 1869" (published in April) was on the table.—*J. W. D.*

Life-Histories of Sawflies. Translated from the Dutch of M. S. C. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.

(Continued from Zool. S. S. 1616).

CIMBEX CONNATA, *Schr.*

Imago. *F. de P. Schrank, Enum. Insectorum Austriæ*, p. 322, No. 648. *Panzer, Deutschl. Ins.* 84, 12 (Tenthr. montana). *Lepel. de St. Fargeau, Monogr. Tenthr.* No. 75. *Klug, Versuch —Gattung Cimbex*, p. 83. *Hartig, Blatt-und Holzwespen*, p. 65. *Zaddach und Brischke, Beobacht*, p. 254.

Larva. *Rösel von Rosenhof, Insectenbelustingungen* II., *Bombyl. eu Vespar*, tab. xiii. p. 57. *De Geer, Mémoires* (Goeze's transl.) ii. 2, 230 (larva only). *Lyonet, Recherches*, p. 175—179, pl. 16. *Ratzeburg, Forstinsecten*, iii. p. 135.

Cimbex niger, abdominis apice, tibiis tarsisque fuscescentibus, alis cæruleo nitore relucentibus (mare) aut fusco-aeneus, nitens, abdominis flavi macula magna basali violacea, alis lutescentibus.

The history of the determination of the insect whose metamorphosis I propose to describe in the following pages, illustrates the difficulty that is placed in the way of subsequent writers when an author of repute has once lent the weight of his name to an erroneous hypothesis, for although in the larval state it had been separated from the nearly allied species by Albin, Rösel and De Geer, it had always been confounded with those species in the perfect state, in consequence of the exceedingly small difference between the imagos. Professor Klug, of Berlin, when distinguishing between the various species in his 'Versuch einer Darstellung der Familien und Arten der Blattwespen Gattung Cimbex, *Fabr.*,' might have recognised Cimbex femorata as a distinct species, by giving due weight to the distinguishing characteristics of the larva; instead of which he has confused it with C. femorata, *L.*, lutea, *L.*, and sylvarum, *Fabr.*, and has named this imaginary species Cimbex variabilis. In proof of the correctness of this view he points to the discordant statements of those authors who had described the metamorphoses of connata or femorata. We are quite willing to allow that these statements are very confused, and that many authors are either obscure or incorrect in their descriptions;

but this is no excuse for passing over as of small value the very precise statement respecting the different food of the larva, the latter being moreover recognisable by the number of blue spots on the sides of the body. It should have struck Klug that, in every description of the large Cimbex larva which fed on the alder, mention was always made of the round blue spots on its side, while, on the other hand, whenever the large sawfly larva feeding on the willow was spoken of, the said blue spots were always absent from the description.

Ratzeburg was the first writer who concluded that the species, the larva of which always had blue markings on the side, and at the same time always fed exclusively on the alder, ought to be separated from the other large Tenthredos—Cimbex variabilis (still used in its collective meaning), axillaris, &c.: he described it in his 'Forstinsecten' under the name of Cimbex Humboldtii, and in this, which we consider a correct view of the case, he has been followed by Messrs. Zaddach and Brischke in the work quoted at the head of this paper.

The reader may now justly remark, if Ratzeburg was the first whose acuteness distinguished the species in question from its allies, why is the name Cimbex Humboldtii, given to it by this author, passed over in favour of that bestowed on it by Schrank? is it quite certain that the insect named by Schrank Tenthredo connata was our species? I admit that I have not had an opportunity of seeing his 'Beiträge zur naturgeschichte,' (Leipzig, 1776), in which the name of connata first appears, also that his diagnosis in the Enum. Ins. Austriæ, p. 322—'Tenthredo, antennis clavatis, nigra; abdomine fasciis flavis' is not quite satisfactory; but, in the first place, the addition—"Habitat in alno" supplies a more truly distinguishing characteristic, and, secondly, I am content to follow the lead of Professor Zaddach, whose clear and acute judgment is accompanied by a most comprehensive acquaintance with literature.

I should be most happy if I might one day be fortunate enough to make known the life-histories of the other species which were included by Klug and Hartig in their C. variabilis. However, when I reflect that I have endeavoured to rear this species from the larva during more than twenty years, and that it was only in 1862 that I first succeeded in getting an imago from the cocoon,—and calling to mind how scarce the larvæ of most of the Cimbices are,—how solitary they live and how long a time the larva remains unchanged in the cocoon (and this is the chief hindrance in rearing them), I fear I should have to look

forward to double the usual term of life in order to be able to elucidate this question.

Zaddach has most carefully noted the literature of the species of Cimbex, and instituted a comparison between the various authors. He arrives at a theory regarding the so-called variabilis which, read by the light of what he and his friend Brischke have been able to make out from their attempts at rearing this species, gives the following result. The Cimbex variabilis of Klug, in all probability, embraces four species, the imagos of which bear a strong resemblance to each other—1, the subject of the present description, Cimbex connata, *Schrank*, called by Ratzeburg C. Humboldtii, and whose very distinct larva is always found on the alder; 2, Cimbex Betulæ, *Zadd.*, the female of which is known as C. sylvarum, *F.*, and whose larvæ (at all events in Germany) live exclusively on the birch; 3, Cimbex Fagi., *Zadd.*, a hitherto doubtful species,—according to Drewsen and Dahlbom the larva feeds on the beech, and is distinguished by the dark brown tint of the skin; lastly, 4, Cimbex Saliceti, *Zadd.*, the pale coloured larvæ of which are found feeding upon two species of willow. These larvæ are described and figured by Bonnet, Lyonet and De Geer: I have also in my possession an unpublished description, (with a beautiful drawing), by C. B. Voet, treating of the last-named species.

Whether these species are constant can be ascertained only by experiments conducted with great care, and requiring much time to be devoted to them. It seems to me that our country is not particularly well adapted for the investigation, as being poor in individuals of the genus Cimbex, and that we may rather look for light from the East—for example, Pommorania.

We will now return to the special consideration of our subject.

I think I may hazard the opinion that the female lays her egg in the petiole of the leaf of the alder, added to which I should be disposed to consider it highly probable that she deposits but few eggs, and that these are placed at considerable distances apart. De Geer states that on opening the abdomen of a female he found it to contain rather large eggs of an oval shape and pale green tint; it is not certain, however, that he actually examined a female of Cimbex connata.

Although the imagos appear in May, I have not succeeded in finding a larva before the month of September. The youngest larva which I have observed was found on the 1st of September, 1861;

it appeared to have already undergone two changes of skin, and had thus probably come out of the egg at the end of July or the beginning of August. I have, however, found nearly full grown larvæ in the first week of September, so that it seems the eggs are laid sometimes in the spring and at others in the beginning of the summer.

Fig. 1, plate 1, represents the young larva above-mentioned, of the natural size; fig. 2 is the same larva magnified. I have no record of its exact length: it had twenty-two legs, the abdominal legs being wanting on the eleventh segment. The head and the thoracic legs were a pale bluish green, the other parts of the body being yellowish green; along the middle of the back there was a row of eleven or twelve round black spots, and next that a narrow yellow stripe: between this latter and the row of black spiracles there was a small round black spot on each segment. I found two more such young larvæ during that year; they were no more lively or active than those more advanced; they were generally curled up like lap-dogs: I was surprised to find that they fed about the middle of the day, as other larvæ which do not feed the whole day usually do so either in the morning or the evening.

According to Zaddach and Brischke (p. 241 of the work mentioned) the larva is pale green previous to the first moult and without yellow lines, but having the three rows of black dots as described above.

After my young larvæ (which I had in the house) had moulted for the first time, which will have been the third time during their existence, they had assumed the colouring which most writers on the subject describe: for example (see fig. 3), the head was pale greenish yellow, the body at the sides was yellow inclining to green, and becoming gradually greener, with two narrow yellow stripes on the back; between them was a somewhat broader line transversely striped with pale and dark blue, and extending to the penultimate segment of the body. Between the row of spiracles, which are blackish, and the yellow lines are twelve round bluish gray spots. The ventral surface, together with the abdominal legs, were pale yellowish green. The eyes were inserted in round black spots.

A full grown larva, represented at fig. 4, which I found nearly in that state on the 7th of September, 1857, crawling on the ground, was slightly different in colouring: it was more of a gray than a yellowish green, and the head had a blue tint. In both these examples each segment of the body, with the exception of the last, was divided into folds by five or six wrinkles. As far as the gray-blue spots on the

middle of the blue dorsal stripe the skin was smooth, then came three white warts one below the other on the fold of the skin below the spot: from the lowest of these proceeded a double row below the spiracle extending upward to the other side of it. Below the stigma was a projecting muscle or fat mass under the skin, which at that spot was covered with sharp, more or less prickly warts. I have represented one of these six-pointed little warts at fig. 6, as it appears when the larva is examined along the side with a very strong lens and in the position of fig. 4.

Figure 7 represents one of the anterior legs of the larva magnified: when this object was examined with a lens the skin appeared to be double at the joints, having single hairs on the middle of the segments; below the base of the claw, which was curved and very sharp, was a round knob.

The spiracles were somewhat of the shape of the impression of a stag's hoof, that is to say, they were surrounded by a thickening of the skin of a dark colour, which had some resemblance to the impression of a stag's hoof in the wet sand.

I never observed these larvæ to eject any fluid as is done by other Cimbex larvæ, especially by those of Cimbex Amerinæ. I was also unable to detect any ducts or openings above the spiracles. Zaddach observes—"Die Larven spritzen wie die übrigen Cimbex larven." On the other hand Rösel says, "Ich mogte sie gleich noch so offter berühren, so bleibe sie doch allezeit trocken." Lyonet does not mention any ejection of fluid. I took advantage of the skin of the head, thrown off in moulting, to sketch some of the parts of the mouth —these are represented on plate 1, in the middle. Fig 9 is the semicircular labrum emarginate at the centre; fig. 10 represents the mandible, on which I observed three small teeth; and at fig. 11 is a drawing of the maxilla, rather strongly dentate, with rounded lateral pieces and a thick palpus tapering to a point. A large proportion of the larvæ which I had collected at intervals during the autumn refused to spin up, turned brown and hard, and died; I was quite unable to discover the cause. Others spun up in a hard cocoon of a brown colour, of which one is represented at fig. 12, plate 2: this cocoon was rough on the outside and covered with little pieces of wood, more or less of a metallic tint, single, and very smooth on the inside. The larvæ remain from seventeen to eighteen months in the cocoon without change of form; this circumstance has been mentioned by former writers on the subject, especially by Lyonet, who lays much stress

upon this matter. The development of these creatures is thus excessively slow in comparison with what has been observed with some species of Nematus, the imagos of which leave the cocoon ten or eleven days after the larva has spun up: it is, therefore, not to be wondered at that the attempt to rear the large Cimbices so seldom succeeds, as too much damp and too great heat are both equally fatal to the life of the larva. After having been disappointed for years, I was at last fortunate enough to rear a female imago from the cocoon: I had a larva which had spun up on the 10th of October, 1861: on the 11th of April, 1863, I very carefully opened the cocoon in the hope of finding a pupa contained in it. In this expectation I was not disappointed, as had so often been the case with other larvæ—I had the pleasure of finding a pupa, which I took to be three or four days old: it lay in a somewhat curved position, and was of a greenish yellow colour, the head and thorax of a somewhat brownish yellow, and the eyes pale brown (see fig. 13). Having made a drawing of the pupa I replaced it in the cocoon, which I closed as carefully as possible. On the 2nd of May following a female imago was developed, represented at fig. 14. Another female appeared from a cocoon, which I had not opened.

Both these examples must be classed under that variety (according to Klug) of Cimbex variabilis which is figured by Panzer as C. montana: they were twenty millimetres long, expanding to forty-three millimetres; the head was of a bronzy brown, with purple tints behind the eyes, and covered with recumbent, silky gray hairs; eyes and mandibles deep brown, palpi pale yellow, antennæ (fig. 15) with the first two joints short and broad, of a brown colour and hairy, the remaining joints pale orange and glabrous; the third joint elongate, the fourth the length of the two basal joints; the fifth again shorter, and then a rather thick knob, clearly composed of four joints anchylosed—thus making nine, the normal number for the antennæ of saw-flies. The thorax is entirely bronze coloured, the under side inclining to purple, and covered with fine shining gray hairs. The coxæ and the larger half of the femora from the base are of the same colour; their lower half and the tibiæ are paler; the tarsi are brownish yellow. The spines at the end of the tibiæ and the patellulæ on the tarsal joints are transparent at the points; the wings are translucent, of a brownish tinge, and clouded at the extremity; the nervures are reddish brown; the stigma, which is very elongated, is deep brown. In the upper discoidal, the first submarginal and the anal cells are

brown spots; the anterior part of the anal cell is divided by a straight nervure. The first segment of the abdomen is bronze coloured, and has a deep semicircular emargination on the dorsum, the space being occupied by a white membrane. The second segment is deep purple; the third yellow, with a broad purple spot, occupying the centre of the dorsum; the fourth yellow, with a longitudinal purple mark in the middle; the remainder yellow. The divisions between the segments are mostly deep purple. The ventral surface is dark, either brown or purple. The valves of the ovipositor are deep brown, and covered with stiff hairs. Although I have so often kept the cocoons of this species, and that for long periods, I have never been fortunate enough to rear a male insect; but Professor Zaddach's expressions respecting that sex are so precise, that I have felt no hesitation in representing a male at fig. 16, from a specimen taken by M. Fransen, near Rotterdam, and preserved in the Museum at Leyden. This writer, after enumerating the characteristics which distinguish the male of C. connata according to the diagnosis of Ratzeburg, continues—"Weit mehr in die Augen fallend als dieses Merkmal, auf welches Herr Ratzeburg aufmerksam gemacht hat, ist ein anderes, welches in den Flügeln liegt. Diese sind nämlich durchsichtig und tragen bald schärfer, bald weniger scharf die gewöhnliche Zeichnung, aber die ganze Flache des Flügels zeigt von der Seite gesehen einen sehr schönen, und lebhaft hellblauen Atlasglanz." With this characteristic as a guide, I have for years past been able easily to separate the males of the different species of sawflies found in this museum under the collective name of C. variabilis, the difference being immediately perceptible. The male which I have represented was twenty-two millimetres long, with a flight of forty-five millimetres. Head, thorax, coxæ and femora black, with a purplish glow; the abdomen is purplish black, a reddish tinge being perceptible on the terminal segments; the basal half of the antennæ is brown, the remainder being orange; the tibiæ are deep brown, the tarsi ferruginous. The whole body is covered with black and brown hairs. The wings are transparent, the nervures being ferruginous, and the stigma dark brown; as mentioned above they have a cærulean reflection in proportion as the light falls upon them.

The ovipositor and saw of the female, represented at fig. 17, have been accurately described by Lyonet: according to his figure the saw differs in some measure from that of Cimbex Saliceti, lutea, or whatever the species may be called, which lives on willows. At fig. 18

I have given a drawing of a part of the margin of the saw, copied from Lyonet.

In conclusion, I should feel obliged to any of my readers who would send me any Cimbex larvæ which they may meet with feeding on willow or beech and birch, so that I may be able to observe their metamorphoses with a view to their publication in this journal.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1670).

APRIL.

Goldcrested Wren.—I have seen so many of these little fellows during the last week, about the hedgerows and plantations, as to lead to the conclusion that many are now returning to their northern summer quarters.

Jack Snipe.—April 5th. Last observed: two pairs seen.

Golden Plover.—April 6th. Last observed: ten seen, all wearing their black waistcoats.

Bartailed Godwit—April 6th. Two seen on the foreshore.

Scaup Duck (Fuligula marila).—April 10th. Last seen on the Humber.

Fieldfare.—April 10th. Last observed, and in considerable flocks.

Tree Sparrow (Passer montanus).—April 19th. Several pairs seen about the marsh hedgerows and pollard hawthorns—evidently intend nesting.

Hooded Crow.—April 20th. I find the hoodie is jotted down in my note-book every day for the last ten, thinking each day would probably be the last: this, however, was "positively their last appearance."

Wild Duck (Anas boschas).—April 23rd. This morning riding across a field of wheat in the marshes I put up a wild duck: where she rose was a single fresh-laid egg; the egg was on the bare ground, no nesting materials having been collected. On the 2nd of May the eggs numbered ten (the total number laid). A circular nest had been formed round them of dead grass and weeds, and they were embedded

in down from the duck's breast: during his wife's absence the drake occasionally associates with some tame ducks in the neighbouring drains, and one day had a fight with their drake, getting, however, well thrashed. Five pairs of mallard are this season breeding in our marsh district. When the ducks are sitting the drakes flock together and resort to the nearest water,—in this case the Humber. I am informed that some few years since eleven drakes, probably representing as many sitting ducks, came daily into the Ashby decoy. During a visit lately made to this decoy, I was told that varieties of the common wild duck are occasionally seen and taken: one duck with a white throat has spent eight winters there; and there is also a spotted duck that has come in regularly for four or five years. The supposed ruddy sheldrake (Zool. 9046) is, I find, merely a *pale variety* of the female of A. boschas, and very similar to one captured on the Humber about the same time, and described by me in the 'Zoologist' (Zool. 9047). It is not surprising that varieties of the wild duck are thus occasionally met with, since the wild birds associate with the tame on our drains. Every year in the autumn hundreds of ducks are brought over from Holland to Grimsby in the steamboats, many eventually finding their way to the Lincolnshire farm-yards. It is impossible to distinguish some of these foreigners from the wild A. boschas; and there are endless varieties, more or less resembling the wild breed. These foreign birds fly nearly as well as their wilder brethren, and will not unfrequently go off altogether: I have heard of their being shot on the Humber; no wonder that occasional varieties are captured in our Lincolnshire decoy.

I recently observed a large dark-coloured round-winged hawk hovering directly over my wild duck's nest: either duck or eggs must inevitably have "come to grief" had it not been for the pertinacious attack of the peewits. This hawk flew like an owl; I think it was a buzzard, but its red-coloured back was unlike that species.

Guillemot, &c.—April 27th. When off Flamborough Head this morning in a friend's yacht, returning from a cruise in the North Sea, we observed large numbers of guillemot, razorbills, and a few kittiwake gulls, but no puffin,—this species, as far as m yobservation goes, not arriving on this coast before quite the end of April. Some scoters and a redthroated diver were also seen. The guillemots were mostly in the summer plumage—some were in the dress of winter, and others again in transition. The cry of this species heard at night is peculiar,

and has quite a human sound, like a good-humoured chaffing laugh—Hah, hah, hah—hah-a-a.

Stone Curlew.—April 28th. When driving across the Crosby Common, near Ashby, about eleven o'clock on the night of the 28th, I heard the stone curlews calling. This species is yet, I am glad to say, comparatively common in this locality; and, I am told, twenty to thirty may be seen in the course of a day's walk. Some years since they were, however, much more abundant.

The great sand commons of Crosby and Frodingham, with their adjoining warrens, were, till very recently, the haunt of many birds now extinct, or becoming very rare in England. This wild land in some respects resembles the "breck" district of Norfolk, differing, however, in its many pools and swamps, fringed with low brushwood, and to a considerable extent overgrown with rank aquatic vegetation, once the stronghold of the bittern, which is yet occasionally seen in the district, but at long intervals, and I am afraid is fast verging on extinction. The ruffs and reeves, once numerous, are now probably extinct: the spotted crake is not uncommon. In the autumn the low marshy portions are the favourite retreat of the shorteared owl, and, I am informed, the almost incredible number of thirty have been seen on the wing together. In the woods of spruce and oak (one alone is four thousand acres in extent), which extend for miles to the south and west of this wild country, woodcocks breed; and some of the best woodcock shooting in the country is to be found here. Some years since, on a neighbouring estate, eighty-five were killed in one day; sixty on the following. Woodcocks are very partial to oak woods, and their presence may be known by examining the dead leaves under the oaks, as these birds, in their search for grubs and insects, turn over the dead leaves, laying them with great regularity in the same position, but the other side upwards. Stock doves are not uncommon, breeding in the warrens in deserted rabbit-burrows. By some they are called sand doves, and the natives have an idea they are distinct from the stock dove of the woods, which nests in holes of trees, or on the tops of pollards; they admit, however, that the only difference is in the size, the sand dove being the smaller of the two. The lively and chastely-coloured wheatear is very abundant, flitting from stone to stone, or perched on the common walls: these walls are built of the dark lias clay, and have a very curious appearance, as they are studded thickly with that characteristic lias fossil, Gryphæa incurva, *Sow.*

Shoveller.—This duck is not uncommon in the Trent district, and two hundred and eighty-five are recorded as having been captured on the Ashby decoy in thirty-five years. It must by no means be supposed that every rare duck which shows itself on a decoy is captured: during the last winter a flock of sixteen shovellers, principally males, came into the decoy; I believe none of these were taken. These ducks have an odd habit of swimming round and round each other in circles—they will do this for hours together. Nearly four thousand ducks—mallard, widgeon and teal—were taken during the season 1848-9. The year is remarkable for the number of widgeon captured.

Garganey Teal.—About twenty garganeys are recorded as having been taken at Ashby in twenty years. A pair of these little ducks were seen in April this year in a pool on the neighbouring common: they were not shot.

Rare Birds killed in the Trent District, North Lincolnshire.—At the sale of the late Captain Healey's effects, at the Ashby-decoy Cottage, were several cases of stuffed birds,—Lincolnshire specimens,—either shot in the neighbourhood or taken on the decoy. Others which I saw now form part of a private collection in the neighbourhood. Amongst the most noticeable were merlin (male and female, the male an old bird in the beautiful mature plumage), common and roughlegged buzzards, fern owls, crossbills (immature), thick-knee plover, bitterns, ruffs and reeves (the former in their beautiful nuptial attire), garganeys, shovellers, pintails and gadwalls, hooper and Bewick's swan, little auk (captured on decoy), pheasant (old English type, Phasianus colchicus), blackcock and redlegged partridges. Black game were introduced into the district; not so, however, the redlegged partridge, which fortunately is a very rare bird.

Hoopoe.—"A hoopoe (Upupa epops) has just been shot in Holbeach Fen, and has been forwarded to Mr. Foster, the curator of the Wisbeach Museum, for preservation."—'Stamford Mercury,' April 30th).

MAY.

Whimbrel.—May 1st. First arrival; several flocks observed.

Common Dotterel.—May 4th. I have had a long walk to-day across the Humber marshes after dotterel, thinking both of a friend's collection and the parasites, which as yet I had had no opportunity of examining. These marshes are one unbroken stretch of pasture land, now as green as an emerald; any "trip" of dotterel could not fail to

be seen with such a background. Whimbrel I found in plenty, but wary and difficult to get near. Swifts were in some numbers, and hawking close to the ground. Peewits everywhere; and a couple or two of wild ducks, evidently residents in the district. Whinchats, wheatears, pipits, yellow wagtails and sky larks on every bank and in every field. On the Humber, but some distance from the bank, was a small flock of scoters, males and females: as I watched them a beautiful mature lesser black-backed gull came sweeping along the foot of the embankment, sailing just below me; then turned and came back over the same ground: surely, I thought, you must know of the "Bird Bill," so let him pass in safety. Late in the afternoon, when returning home, having given up all chance of seeing any dotterel, I came most unexpectedly on to a small trip of six, and as they rose dropped two. Poor little fellows! Now I had them in my hand, I wished them alive again; and although I had been out that day for that purpose alone, walked homewards with something of a heavy heart. This shooting is the worst part of an ornithologist's work, and at such times even the "sacred cause" itself seems hateful. Often, after watching with my glass some little group of birds, noting down all their pretty ways and habits, and looking as it were into their dark truthful eyes, I have felt the greatest reluctance in taking up my gun. It is all very well when birds spring up suddenly and unexpectedly, but this shooting in cold blood, sneaking up under cover of bank or hedge, is not pleasant work. In all our ornithological rambles it is well to bear in mind that beautiful sentiment of the poet—

> "He prayeth well who loveth well
> All things, both great and small;
> For the dear God that loveth us,
> He made and loveth all;"

and to make it a rule never to destroy more than is absolutely necessary for the pursuit of knowledge.

Spotted Flycatcher.—May 10th. First appearance.

House Martin.—May 11th. First seen: a single bird, and the only one observed up to the present day, the 19th of May.

Gray Plover.—May 11th. Common as this species is on our "flats" in May, owing to their extreme wildness I have never yet had the good fortune to obtain specimens in the full summer dress; nor, as far as I am aware, have our numerous gunners been more successful. On a stretch of coast, less than half a mile in extent, I have this day seen upwards of a hundred in flocks of from ten to twenty; and, what

is rather remarkable, nearly all are mature birds in full summer plumage, the transition dress being quite the exception. Every little flock of plover had its attendant dunlins, now likewise in the summer dress. All these birds were within three hundred yards of the embankment: I frequently observed them pick up some small object from the "flats," probably crabs which swarm in all the shallow pools.

Bartailed Godwit.—May 17th. Nine seen on the foreshore this afternoon; six, in company with gray plover and dunlin, were following the slowly receding tide, and working their long, slightly recurved bills with great perseverance: of these birds five were in the sober gray winter dress, the sixth only showing some patches of rufous on the under parts. Within two hundred yards of the bank was a group of three—one, the largest, in full plumage, from its size and some peculiarities in the colouring, I conjecture a female; I have never seen a finer or more richly coloured bird of this species. The ladies' companions were in sober gray, and, as yet, show no trace of changing their dress. My telescope, a powerful one, brought the group close up to my face: without changing my position amongst the long coarse sea-grass, I had, beside the godwits, sixty-one gray plovers, several hundred dunlins, and a few whimbrel and brown-hooded gulls, within easy telescope range—not an every day sight for an ornithologist. The cry of the godwit is a wild shrill whistle: on the wing they somewhat resemble a whimbrel, but are a slenderer looking bird, and their wings seem narrower and more pointed; their cry will, however, at once mark them. I do not consider the godwit a naturally wild and shy bird, but from their feeding almost invariably with curlew, whimbrel or gray plover, they rise with the rest of the company. One I shot some years since on our pasture land permitted me to walk up within short range.

JOHN CORDEAUX.

May 26th, 1869.

Notes on the Zoology of Newfoundland.

By HENRY REEKS, Esq., F.L.S., &c.

(Continued from S. S. 1695.)

Letter 3.—ORNITHOLOGY.

HIRUNDINIDÆ—continued.

Purple Martin, Progne purpurea (*Linn.*)—This beautiful species appears rare in Newfoundland; at least I only obtained one specimen shot at Daniel's Harbour in June, 1868: the settlers did not seem to

be acquainted with the bird, or know anything of its breeding habits.

(Note.—Of the Bombycillidæ Ampelis cedrorum, *Baird*, should be looked for in Newfoundland.)

LANIIDÆ. The Shrikes.

Great Northern Shrike, or *American Butcher Bird*, Collyrio borealis (*Vieill*).—Visits Newfoundland in its periodical migrations, but appears rare. Perhaps a few remain to breed on the island, although I have no evidence at present to prove it.

Yellowthroated Flycatcher, Vireo flavifrons, *Vieill.*—A summer migrant, and appeared tolerably common in 1868; arriving in June at Cow Head.

LIOTRICHIDÆ.

Winter Wren, Troglodytes hyemalis, *Vieill.*—Common, and resident throughout the year.

CERTHIADÆ.

American Creeper, Certhia americana, *Bonap.*—Apparently a summer migrant, but not very common. I am inclined to think this bird may not migrate, although I did not observe it in the depth of winter.

Redbellied Nuthatch, Sitta canadensis, *Linn.*—Perhaps a resident on the island. The only one obtained was in April, 1868: it is certainly a rare bird at Cow Head.

PARIDÆ.

Blackcap Titmouse, Parus atricapillus, *Linn.*—Common, and resident throughout the year. Breeds in holes in trees; sometimes adopts deserted holes made by Picus pubescens.

Hudsonian Tit, P. hudsonicus, *Forster.*—Common, and non-migratory. Breeds in holes in trees, and associates with the preceding species in winter, at which season the juvenile Newfoundlanders frequently amuse themselves by calling these little birds around them and knocking them off the boughs with a stick, or even the ramrods of their guns: my specimens were obtained for me in this manner.

FRINGILLIDÆ.

American Pine Grosbeak, Pinicola canadensis (*Briss*).—Common throughout the year, but apparently more abundant in winter, when they get together in small flocks of about two broods: they feed on

the *buds only* of Pinus, Abies, Larix, &c., and are very tame, being often killed with sticks. Provincial name, "Mope."

Yellow Bird or *Thistle Bird*, Chrysomitris tristis (*Linn*).—A common summer migrant.

Pine Finch, C. pinus (*Wilson*).—A summer migrant, but apparently not so common as the preceding species.

From my short residence in Newfoundland the observations on the distribution of some of the smaller species belonging to the Fringillidæ, Sylvicolidæ, &c., may not be of much value; *e. g.*, it is very probable that some birds, especially of these families, which are not uncommon, and even generally distributed over the island, may have altogether escaped my notice, while, on the other hand, some rare, or otherwise not regular migrants may have fallen to my gun on more than one occasion during the summers of 1867 and 1868: in such cases I have naturally stated the birds to be frequent, or common, as the evidence may tend to show.

American Crossbill, Curvirostra americana, *Wilson*.—Common throughout the year, and an early breeder. Feeds on the seeds of Coniferæ, and is called by the settlers the "Large spruce bird," to distinguish it from the following species.

Whitewinged Crossbill, C. leucoptera (*Gmelin*).—These pretty little birds are common throughout the year, but more abundant during winter, when they congregate in small flocks of from five to twenty individuals, feeding principally on the cones of the white spruce (*Abies alba*). When feeding these birds are usually very tame, and easily approached. I kept an old "Joe Manton" loaded with small shot in the house, for the purpose of shooting crossbills and other small birds, and remember on one occasion snapping three percussion caps at a small flock of C. leucoptera, within fifteen yards of me, without causing them sufficient alarm to take wing. They have a very pleasing note, much resembling the song of the canary. The provincial name is "Spruce bird."

Mealy Redpole, Ægiothus linaria (*Linn*).—Very common, and does not migrate. Breeds early, and generally in alder bushes; hence its provincial name of "Alder bird." Feeds on the buds of Coniferæ, &c., when the ground is covered with snow.

Snow Bunting, Plectrophanes nivalis (*Linn*).—Very common in its periodical migrations, but I scarcely think breeds on the island, although I saw a good many there in June last (1868). Provincial name "Snow bird."

I did not meet with P. lapponicus (*Linn*), but it is probably seen on some parts of the island.

Savannah Sparrow, Passerculus savanna (*Wilson*). — Abundant throughout the summer: frequents grassy places, building its nest on the ground. Provincial name "Grass bird."

Whitecrowned Sparrow, Zonotrichia leucophrys (*Forster*). — A common summer migrant, arriving in May.

Whitethroated Sparrow, Z. albicollis (*Gmelin*).—A summer migrant, and equally common as the preceding species. Arrives in May, usually towards the latter end of the month.

Snow Bird, Junco hyemalis (*Linn.*)—A summer migrant, arriving about the last of May, and tolerably common throughout the summer.

Chipping Sparrow, Spizella socialis (*Wilson*).—A common summer migrant.

Fox-coloured Sparrow, Passerella iliaca (*Merrem*). — This fine species of sparrow is a summer migrant and very common: it is called the "Hedge sparrow" by the settlers, and is very troublesome in gardens, scratching up fine seeds. Breeds sometimes on the ground, at others in low bushes.

ICTERIDÆ.

Rusty Blackbird, Scolecophagus ferrugineus (*Gmelin*).—A regular and common summer migrant, remaining generally until after the first fall of snow.

Crow Blackbird, Quiscalus versicolor (*Linn.*)—A summer migrant, but rare; at least I only saw one specimen at Parson's Pond, about twelve miles north-east of Cow Head.

CORVIDÆ.

American Raven, Corvus carnivorus, *Bartram*.—Common throughout the year. I think Wilson and Audubon were right in not separating this bird from the European C. corax. I cannot see the least difference—at least not more than would be found in examining a quantity of either species, if they are distinct. The more slender bill is more individual than typical of the American bird. The eggs certainly cannot be separated, but this is also the case with several of the Corvidæ, which are otherwise well marked and well-known species.

American Crow, C. americanus, *Audubon*.—A common summer migrant to Newfoundland, arriving in April. Frequents the sea coast: breeds in trees, and lays four or five eggs, much resembling those of C. frugilegus. It is called the "Otter crow" by the settlers.

Pica hudsonica (*Sabine*).—May reasonably be expected to occur in Newfoundland, but I am inclined to think it does so only as a straggler.

Blue Jay, Cyanura cristata (*Linn.*)—A summer migrant, but not common. Breeds in Newfoundland, and is called the "Silken Jay" by the settlers.

Canada Jay, Perisoreus canadensis (*Linn.*)—Common, and remains throughout the year. In some of its habits, and especially its familiarity, this bird much reminds the English sportsman of robin redbreast at home. When camping in the woods miles back in the country the Canada Jay, or, as it is often called, "Whiskey Jack," was ever my constant, and frequently only feathered, companion. Like others of its tribe it appears very partial to raw meat for food, although when in the vicinity of houses becomes almost omnivorous, eating bread, fish, potatoes, &c., with an evident relish. It is said to collect and store away large quantities of cranberries for winter use. I have never met with any of these "stores," but have often noticed the jays picking the berries, especially in the spring of the year where the snow has disappeared in patches in the open marshes. In a state of nature I think the Canada Jay is even tamer than the robin: I remember on one occasion, particularly when deer-hunting in the country, I had the hearts of three caribou hanging to the "tilt," or camp, within four feet of my head, and although unable to leave the "tilt" for the whole day from bad weather, the jays managed to eat all the fat from the hearts, notwithstanding I continually drove them away, but, like vultures and carrion crows, with every reappearance their seemed a reinforcement, until at last to save my venison I had to amuse myself by firing balls at them from my rifle as they sat on and picked a fine fat quarter of caribou only a few yards distant from the camp. My specimens were obtained by tying a piece of meat to the pan of a rat-gin and retiring a few yards from the trap: they were invariably caught by the bill. The settlers, strange to say, cannot succeed in keeping this bird alive in confinement.

I did not meet with any of the Columbidæ in Newfoundland: Ectopistes migratoria (*Linn.*) may prove an occasional straggler there.

TETRAONIDÆ.

Canada Grouse, or *Spruce Partridge*, Tetrao canadensis, *Linn.*—A very rare and uncertain visitor from the mainland: two killed,

and two others seen by the settlers during my residence at Cow Head.

Willow Grouse, Lagopus albus (*Gmelin*).—Common throughout the year, and the only lowland or subalpine species indigenous to Newfoundland. From my own experience I think the willow grouse invariably roost on the ground, although I have frequently shot them when feeding in the tops of birch and alder trees, more especially when the ground is covered with deep and light snow. Their food consists chiefly of the buds and tender shoots of birch, alder, black spruce (*Abies nigra*), juniper (*Larix americana*), &c., but they seem partial at other seasons to the partridge berry (*Mitchella repens*) and cranberry (*Oxycoccus palustris*). I do not possess specimens of willow grouse from Europe or northern North America (Hudson's Bay, &c.), but Professor Baird says, "I find a considerable difference in different specimens of the large ptarmigan [L. albus] before me. Those from eastern Labrador and Newfoundland appear to have decidedly broader, stouter and more convex bills than those from the Hudson's Bay and more northern countries. I think it not improbable that there may be two species. . . . ." Professor Newton, however, informs me that "none of Professor Baird's later writings have gone to strengthen the suspicion expressed by him formerly as to the existence of a second species of willow grouse," and adds, "I have compared a pretty good series of skins from many parts of North America, extending from Alaska to Newfoundland, and so far as I can judge I have no doubt they are all of one and the same species, which is further identical with the willow grouse of Europe (*Tetrao saliceti*, Temminck; *T. subalpinus*, Nilsson)." I have never succeeded in driving the willow grouse into a bank of snow, as Sir John Richardson states in 'Fauna Boreali Americana,' vol. ii., p. 352, as being a habit peculiar to the species, nor had the settlers observed anything of the kind. They are sometimes so tame that they may be killed with a stick; at other times so wild that they will not allow you to approach within gunshot, and such is generally the case in winter when the snow is hard and crusty, and the noise of your rackets (snow-shoes) alarms them. They are shot at all seasons by the settlers, and generally when sitting on the ground, although there is every excuse for doing so, especially in thick woods, for if once flushed there is rarely a chance of coming up with the covey again, and this is an important consideration where food and powder and shot are not too plentiful among the poorer population. In one of my

walks soon after I landed on the island I came up with a small covey of willow grouse and killed a brace, but owing to my dog—a borrowed one, which was evidently more used to rushing into the water for wounded seals and ducks, than retrieving grouse,—I was unable to get another shot at the birds. Upon showing the brace I had killed to the owner of the dog, on my return, the following conversation ensued:—"Got two *pattridges* then, sir?" "Yes." "All there was there, I 'spose?" "Oh, no; there were ten in all, I think." "Then they was wild I 'spose, sir?" "No, they allowed me to get sufficiently near to kill one with each barrel as they rose." "What, sir, you never fired at 'em to wing!" "Of course I did; how would you have me shoot at them?" "Why, sir, if I had been there I should have walked round and round them *pattridges* till I had got 'em all in a heap, and then I should have killed nearly all at a shot: I never heard of nobody firing at a *pattridge* to wing." If the settlers could be induced to observe a close time for these and other valuable game birds, the practice of shooting them in this apparently wholesale manner would not greatly diminish their numbers. The willow grouse is called *the* "partridge" by the settlers, and frequents beds of alder and dwarf birch in swampy places, especially on the borders of lakes and rivers. It breeds on the ground among stunted black spruce, in rather drier situations. One peculiarity in the Newfoundland bird is, that I have *very rarely* found the middle, or incumbent pair of tail-coverts "entirely white" in winter, as they are stated to be in 'Birds of North America,' p. 634.

Rock Ptarmigan, L. rupestris (*Gmelin*).—A truly alpine species in Newfoundland; rarely found below the line of stunted black spruce, except in the depth of winter, when they descend to the low land and feed on the buds of dwarf trees, sometimes in company with the willow grouse, but I never saw this species perch on trees: it is called by the settlers the "mountain partridge."

GRUIDÆ.

I was informed by one of the settlers that a "brown crane" was killed a few years since at Codroy, Newfoundland, and some others seen. I am of opinion that they must have been "stragglers," and it is therefore hard to determine the species. Did they really belong to the genus *Grus?*

ARDEIDÆ.

American Bittern, Botaurus lentiginosus (*Montagu*).—A summer migrant to Newfoundland, and the only species of the heron family that I met with. A pair of bitterns are generally found frequenting the margins of wooded lakes and ponds in the lowlands throughout the summer, arriving early in May and departing again about the last of September. Yarrell describes the legs and feet as "greenish brown;" they are, however, of a pretty yellow-green, but soon lose this colour after death. The American bittern makes a curious thumping noise, very much resembling the noise made by fishermen when driving oakum into the seams of their boats; hence probably arose its popular name of "stake-driver" in the United States, and "corker" (? caulker) in Newfoundland.

CHARADRIDÆ.

American Golden Plover, Charadrius virginicus, *Borck.*—Visits Newfoundland abundantly in the autumnal migration, but very rarely, if at all, in the vernal.

Killdeer, Ægialitis vociferus (*Linn.*)—Not so common as the preceding, otherwise the remarks on that species are equally applicable here.

Ring Plover, or *Semipalmated Plover*, A. semipalmatus (*Bon.*)—A summer migrant and breeds on the coast: this and the following species are called "beach birds."

Piping Plover, A. melodus (*Ord.*)—Appeared to be a common autumn migrant, congregating in large flocks.

Grey Plover, or *Blackbellied Plover*, Squatarola helvetica (*Linn.*)—Very common in the fall of the year, but I did not meet with it in Spring: the plovers evidently take some other, and probably more direct route than *viâ* Newfoundland to their breeding grounds in the far north.

HÆMATOPODIDÆ.

Turnstone, Strepsilas interpres (*Linn.*)—Abundant on the sea-shore in the fall of the year, and generally so fat that the settlers have bestowed on it the appropriate name of "fat oxen."

Of the Recurvirostridæ I did not meet with either Recurvirostra americana, Gmelin, or Himantopus nigricollis, Vieillot, although both, but more especially the former, may reasonably be expected to occur periodically.

PHALAROPODIDÆ.

Red Phalarope, Phalaropus fulicarius (*Linn.*)—Visits Newfoundland generally in the month of June, and is sometimes tolerably common, but I doubt whether it breeds on the island. This is undoubtedly our old friend Phalaropus lobatus in its nuptial dress, and the American authors have done well in restoring to it the Linnean name of fulicarius, because it is yet a matter of doubt whether the Tringa lobata of Linnæus in Systemæ Naturæ ever applied, or was intended to apply, to this species. It is the only species of phalarope I got in Newfoundland, and was called by the settlers the "gale bird." It is wonderful to watch these pretty and delicate-looking little birds swimming and taking their tiny food from the crests of waves that would "swamp" any boat and many schooners. They are very tame, and swim almost within arm's length of the rocks, giving one the idea that the next immense wave which is fast approaching will cast them on shore, or smash them against the rocks: at such times it takes a quick shot to kill them on the water.

SCOLOPACIDÆ.

European Woodcock, Scolopax rusticola, *Linn.*—A single specimen is said to have been killed in the neighbourhood of St. John's, in January, 1862 (See 'Ibis,' 1862, pp. 284, 285). If no deception has been practised here, it is certainly a very extraordinary capture, as is also that of another specimen since taken near New York. To those who have spent any length of time on the coast of North America, the problem of the occurrence of so many American birds in Europe is soon solved: it is undoubtedly caused by the prevalence, especially in the fall, of great gales of westerly winds, which probably take most of our American stragglers off the east coast of Newfoundland; but how to account for the appearance of two stray specimens of S. rusticola being killed in America—far apart, but in each case near a populous city, and by those so well up in ornithological literature as to be aware of the value of such captures, presents a difficulty by no means so easily disposed of. Of course it is probable that land birds may occasionally get blown off our west coasts by rough easterly winds, but it is equally probable that before they had gone one-third across the Atlantic they would take the wind dead ahead, which would cause them to 'bout ship and be thankful for a fair breeze home. It does not require a great stretch of the imagination to account for the

appearance of an Icelandic species in Greenland, or the northern parts of the American continent, or even in Newfoundland, but if I remember right the European woodcock is not found in Iceland.

American Woodcock, Philohela minor (*Gmelin*).—Probably occurs on the island, but my accident prevented my thoroughly searching situations likely to produce this species. It would only occur as a summer migrant.

Wilson's Snipe, Gallinago Wilsoni (*Temm.*)—A common summer migrant, arriving generally about the last week in April, and soon commences breeding. When the female is sitting on her nest the male frequently rises in the air, drumming and making a peculiar rushing noise with its tail, which may be heard a considerable distance.

Gray Snipe, Macrorhamphus griseus (*Gmelin*).—A summer migrant. The remarks appended to the preceding species appear equally applicable to this.

Gray Back ; Robin Snipe, or *Knot*, Tringa canutus (*Linn.*)—Visits Newfoundland only in its periodical migrations.

Purple Sandpiper, Tringa maritina, *Brunnich.*—A summer migrant, but rather rare at Cow Head ; probably more common on the southern shores of the island.

American Dunlin, T. alpina, var. americana, *Cassin.*—A summer migrant, but much more abundant in the fall of the year.

American Jack Snipe, T. maculata, *Vieill.*—A summer migrant, and tolerably common.

Least Sandpiper, T. wilsonii, *Nuttall.* — A common summer migrant.

Bonaparte's Sandpiper, T. bonapartii, *Schlegel.*—A common summer migrant, collecting in flock in the fall of the year at the seaside, and generally so tame that a dozen to twenty may often be killed at a shot. This remark applies also to some other allied species of sandpipers and small ringed plovers which congregate on the coast every autumn, from some flocks of which upwards of sixty have been killed at a shot; giving some idea of the immense quantities of these little birds. The pretty little pigeon hawk (*Falco columbarius*) is a cruel attendant on these flocks of small Tringæ. Professor Newton informs me that "Tringa bonapartii is the Schinz's Sandpiper of Yarrell and other English authors, though not the true *T.* schinzi."

Sanderling, Calidris arenaria (*Linn.*)—Visits Newfoundland periodically: abundantly in the fall, but very sparingly, if at all, in the spring.

Semipalmated Sandpiper, Ereunetes petrificatus, *Illiger*.—Another common species on the coast in the fall.

Stilt Sandpiper, Macropalama himantopus (*Bon.*)—Not common at Cow Head. I killed one specimen in September, 1867, and saw a few others which appeared of the same species.

Willet, Symphemia semipalmata (*Gmelin*).—Common in the fall of the year, especially in the spotted or immature plumage.

Tell Tale, or *Stone Snipe*, Gambetta melanoleuca (*Gmelin*).—A summer migrant, but not so common as the following species.

Yellow Legs, or *Yellowshanked Sandpiper*, G. flavipes (*Gmelin*).—A summer migrant, arriving in May and departing again in October. A great many pairs breed in the marshes, but I think the majority pass on to more northern regions, and return in August and September in increased numbers, generally at that season very fat and much appreciated for the table, but being small birds they are not usually shot at by the settlers unless four or five can be killed at a shot. Sometimes they are very tame and take little notice of men or dogs: at other times they are so wild that I know no bird more difficult of approach, and then they are a perfect nuisance to the sportsman, as they not only keep out of range themselves, but alarm every other bird by their incessant cry of "twillick," "twillick." Many a blessing (?) have I bestowed on these birds when, after crawling on my hands and knees a quarter of a mile through long wet grass on boggy soil to get a shot at a flock of black ducks (*Anas obscura*), I have heard the everlasting "twillick," and seen the ducks take wing instantly, perhaps not eighty yards from me. I fear since my visit many a skeleton of poor "twillick" lies bleaching in the marshes by the sea-coast near Cow Head. Provincial names of this bird are "twillick," "twillet" and "nansary"—the latter name more frequently in the south of the island.

Solitary Sandpiper, Rhyacophilus solitarius (*Wilson.*)—Not uncommon in summer, generally towards autumn.

Spotted Sandpiper, Tringoides macularius (*Linn.*)—A common summer migrant, arriving early in May: breeds on the coast, and lays its four eggs sometimes in a hollow on the bare shingle; at other times in short grass, but always just above high-water mark. Provincial name "wagtail."

Bartram's Sandpiper, Actiturus bartramius (*Wilson*).—Visits Newfoundland periodically, but is rarely met with during the vernal migration. I doubt if it breeds in Newfoundland, although known to do

so on the mainland both north and south of that island. Like the peewit at home this species prefers inland and cultivated districts.

Buffbreasted Sandpiper, Tryngites rufescens (*Vieill*).—A summer migrant, but not very common. I did not succed in taking eggs of this species, but I think it breeds on some of the drier spots in marshes in Newfoundland.

Marbled Godwit, Limosa fedoa (*Linn.*)—Only a periodical visitor; most common in the fall. This and the following species are called "dotterels," by the settlers.

Hudsonian Godwit, L. hudsonica (*Latham*).—Visits Newfoundland in its periodical migrations, but is most common in the fall of the year, when it is generally very fat and much appreciated for the table.

Longbilled Curlew, Numenius longirostris, *Wilson*.—A periodical migrant much sought after by the settlers, who are great adepts in imitating its whistle, by which means they kill many that would otherwise pass a long distance out of range. It is a fat, good-eating bird in the fall.

Hudsonian Curlew, N. hudsonicus, *Latham*.—Frequently confounded by the settlers, under the name of "Jack Curlew," with the preceding species, with which it is about equally common, and like that visits Newfoundland in its migrations, but does not breed there.

Esquimaux Curlew, N. borealis (*Forster*).—By far the most common species of curlew, but like the preceding species is only a periodical visitor; coming by thousands in the fall, but very rarely in the spring; in fact, I think they take some other and more direct route at that season. They feed on the berries of *Empetrum nigrum*, which stain the feathers posteriorly a rich dark purple. These birds arrive in Newfoundland on their migration about the last week in August, and remain until the end of September, when they are always very fat, and delicious eating. I was told by one of the old English settlers that they were so abundant some seasons that he had himself shot fifty in one morning before sunrise.

Virginia Rail, Rallus virginianus, *Linn.*—A summer migrant and apparently rare: I saw only one specimen; but the well known habits of the *Rallidæ*—that of concealment among reeds in marshy places—may account for a seeming paucity in individuals.

Common American Rail, Porzana carolina, *Vieill.*—A summer migrant, and, although not common, is probably more so than the preceding.

American Coot, Fulica americana, *Gmelin.*—Although this bird is perhaps a regular summer migrant to Newfoundland I never met with it, neither do I think it is *the* "Coot" of the settlers; if so, I know it is frequently confounded with *Pelionetta perspicillata* (*Linn.*), the surf scoter.

ANATIDÆ.

American Swan, Cygnus americanus? *Sharpless.* — Apparently a rare and accidental visitor to the western coast of Newfoundland: I saw only one specimen, which was an adult bird flying, south in the fall of 1867.

Snow Goose, Anser hyperboreus, *Pallas.*—Very rare: I heard of one or two being obtained in the north of the island, and an equal number on the west coast.

American Whitefronted Goose, A. gambeli, *Hartlaub.*—Equally rare with the preceding, or perhaps more so. It seems extraordinary that these two common species of American geese should be so rare when we consider that Newfoundland, in one place, is only separated by twelve or fifteen miles of water from the mainland.

Canada Goose, Bernicla canadensis (*Linn.*)—A regular summer migrant, and by far the most abundant species, arriving in April and in May by "countless thousands." The majority pass on to more northern regions to breed, although a great many remain for that purpose in Newfoundland; but, besides a general discrepancy in size, I have almost invariably found the northern migrants of this species much darker on the breast; in fact so much so that we used to call them the "little blackbreasted northerners." The colour of the "down" appears a good distinction between the sexes: on the male it is light gray, and on the female dark gray, almost black. This was pointed out to me by the settlers, who, however, know how to separate the sexes by the shorter bill and head of the goose. The Canada goose is greatly prized for the table, and the settlers are adepts in "toling" them within gunshot in the spring of the year, but it cannot be done in the fall, or during the autumnal migration: a dog is generally used for this purpose. The sportsman secretes himself in the bushes or long grass by the side of any water on which geese are seen, and keeps throwing a glove or stick in the direction of the geese, each time making his dog retrieve the object thrown: this has to be repeated until the curiosity of the geese is aroused, and they commence swimming towards the moving object. If the geese are a considerable distance from the land, the dog is sent into the water, but as the birds

approach nearer and nearer the dog is allowed to show himself less and less: in this manner they are easily toled within gunshot. When the sportsman has no dog with him he has to act the part of one by crawling in and out of the long grass on his hands and knees, and sometimes this has to be repeated continuously for nearly an hour, making it rather a laborious undertaking, but I have frequently known this device succeed when others have failed. The stuffed skin of a yellow fox *(Vulpes fulvus)* is sometimes used for toling geese, and answers the purpose remarkably well, especially when the geese are near the shore, by tying it to a long stick and imitating the motions of a dog retrieving the glove or stick. Foxes have frequently been observed to practice the same device in a state of nature, and the settlers who prize fur more than feathers commence toling poor Reynard within range of the fatal shot, which, strange to say, considering the general craftiness of the animal, is very easily done. The Canada goose may often be toled from a long distance when on wing by "cronking" or imitating its cry. When these geese fly either in pairs or in flocks a gander invariably leads: this fact is so well known to the settlers that when firing at a pair of geese they invariably shoot at the hinder bird, not only because the goose is the fattest (in the spring), but because the gander will generally fly round and round its dead mate for some little time: such affection but too often proves fatal, especially when the shooter has the use of two barrels, but such is not generally the case among the settlers, who chiefly use the old-fashioned long duck guns, single barrelled, of ten or twelve bore. Ice-gazes and false geese are also employed on the ice for killing these beautiful birds in the spring of the year. Like the domestic goose, which has been known to live upwards of a hundred years, these birds are supposed by the settlers to live to a great age. A few years ago a specimen of the Canada goose was shot at Grosswater Bay, on the Labrador, which had a thin brass collar on its leg initialed and dated just thirty years previous to its capture. This species does not commence laying until three years old, and from examining the ovaries of several evidently young females I found them to contain from 180 to 190 eggs, which, averaging six per annum, would limit the laying period to some thirty or thirty-one years; so that, bar accidents, the birds would not probably live more than forty or forty-five years.

Brent Goose, B. brenta, *Stephens*.—Very common on the southern and western parts of Newfoundland in its periodical migrations, but

very rare farther north than St. George's Bay, in 48½ N. latitude, or occasionally Port au Port, whence it crosses to Anticosti and thence up the Labrador shore. Two specimens were said to have been seen on wing at Cow Head last spring (1868), but the double-crested cormorant (*Graculus dilophus*) flies much like a small goose, and I fancy the birds thought to be Brents were of this species.

Mallard, or *Common Wild Duck*, Anas boschas, *Linn.*—Very rare: I only examined one normal specimen of this species, also one of the supposed hybrids between this species and the muscovy (*Cairina moschata*), which had been shot and skinned by two of the settlers a few years since, and preserved as curiosities. The larger bird was considered by them a drake of the domesticated variety, and I have certainly seen some of the descendants of the "Lincolnshire" breed much resembling it, but as I was informed no ducks except eiders (*S. mollissima*) were kept domesticated on the island, the bird had probably wandered north in company with a flock of some other species.

Black Duck, A. obscura, *Gmelin.*—This is the common wild duck of the island, and is abundant throughout the summer. It breeds among rushes and long grass on the borders of lakes and rivers, and lays from ten to fifteen eggs, which much resemble those of the preceding species. The black duck is much esteemed for the table, but is usually a very shy bird, and not easily approached except from the leeward, as it will "wind you like a deer."

Pintail Duck, Dafila acuta (*Linn.*)—Very rare, but known to some of the settlers as the "long-tailed duck."

N.B.—The true "long-tailed duck" (*Harelda glacialis*) is called a "hound" in Newfoundland.

Green-winged Teal, Nettion carolinensis (*Gmelin*).—A summer migrant, and appears to be the "common teal" of the island.

Blue-winged Teal, Querquedula discors (*Linn.*) — Rare in the neighbourhood of Cow Head, and probably nowhere on the island so common as the preceding species.

Shoveller, Spatula clypeata (*Linn.*) — A summer migrant, and generally distributed over the island, but is by no means common. It is called "pond diver" by the settlers.

Gadwall, or *Gray Duck*, Chaulelasmus streperus (*Linn.*)—Rare: does not breed on the island, but is occasionally killed during its periodical migration.

Baldpate, or *American Widgeon*,* Mareca americana (*Gmelin.*)—A common summer migrant, and when fat one of the best flavoured of American ducks. The adult male of this species, which is called a "cock widgeon" by the setlers, is, in summer plumage and fresh killed, one of the handsomest ducks in Newfoundland.

English Widgeon, M. penelope ? (*Linn.*) — Although only a straggler to the continent of North America, it is not improbable that this species occasionally occurs in Newfoundland, especially *en route* from Greenland to the United States, whence most of the captures are recorded.

Scaup Duck, or *Big Blackhead*, Fulix marila (*Linn.*)—A very rare straggler to the N.W. coast.

American Scaup Duck, F. affinis (*Eyton*).—Occasionally shot in spring or fall, but rarely seen at Cow Head.

Ring-necked Duck, F. collaris (*Donovan*).—Equally rare with the preceding species.

Aythya americana (*Eyton*) and A. vallisneria (*Wilson*) may reasonably be expected to occur in Newfoundland.

American Golden Eye, Bucephala americana (*Bon.*)—A very common summer migrant; one of the first to arrive in spring, and remains until frozen out in the fall. Breeds in holes in trees, sometimes near the ground, but very frequently fifteen or twenty feet high, and often a considerable distance from water. The hole is generally made in a rotten tree, and I think always by the bird itself: it is called the "pie duck" by the settlers, and the young birds are considered good eating.

Buffel-headed Duck, or *Butter Ball*, B. albeola (*Linn.*)—Rare; at least at Cow Head, where it is called the "Spirit duck."

Harlequin Duck, Histrionicus torquatus (*Linn.*) — A common summer migrant, and breeds on the borders of lakes and rivers flowing into the sea, frequently many miles in the country, whence it brings its young in July. The male of this species, which is called a "lord" in Newfoundland, is decidedly the handsomest little duck inhabiting those cold regions, and is a most expert diver. It seems extraordinary

* A male *Mareca* which I obtained in Newfoundland differs from type specimens in being of an uniform dark brown on the back, without the ordinary transverse bars; in its smaller size (*barely* 19 inches; wing 10; tarsus 1.10); legs and feet blue; irides WHITE; culmen less convex; and by having a broad conspicuous white band on the wings. Mr. G. R. Gray and Professor Newton are unable to refer the specimen to any other species than *M. americana*.—H. R.

that any bird when quietly settled on the water, and within twenty yards of you, should escape by diving from the shot of a percussion gun; but how far more astonishing is it that birds on the wing, and within easy range, should employ the same device, and yet the little "lords" and "ladies" (females) frequently escape by doing so! The amateur sportsman, unacquainted with this fact, is amazed at his own prowess, when, having shot at eight or ten of these birds on the wing. he sees the whole flock drop apparently "stone dead" into the water; but his vexation perhaps exceeds his amazement when, in a few seconds, he again sees his little flock of harlequins on wing, and that too just out of range for his second barrel. The harlequin duck is frequently found sitting on rocks many feet above the water, but, from its small size and resemblance to the parti-coloured rocks, is very difficult to see in time to get a shot by stalking. Adult males are generally distinguished as "old lords," and females as "jennies."

Long-tailed Duck, Harelda glacialis (*Linn.*) — This handsome species is very common all along the coast in fall and spring,—in fact, as long as there is any open water throughout the winter; but I think does not breed anywhere in Newfoundland, although I have an adult male in summer plumage which was shot at Cow Head on the 13th of June, 1868.

To the naturalist and sportsman there can be few more interesting sights than seeing several hundreds of "hounds," as these birds are called by the settlers, in a flock, and hearing their clamorous cry of "Cow-cow-wit," "Cow-cow-wit," which, when borne on the breeze from a distance, has a fancied resemblance to a pack of hounds in full cry, and, however fanciful the comparison, it always proved sufficiently obvious to recall many pleasant reminiscences of bygone days. The longtailed ducks usually frequent shoals and beds of "killup" (kelp) in one to five fathoms of water, but I have seen them diving for food in thirty fathoms of water. Like many other oceanic birds they are expert divers, and it is sometimes almost impossible to kill them when sitting on the water; and I really think the nearer you are to them the more likely are they to evade the shot, but, of course, everything depends on the day; if dull and cloudy, or with snow on the ground, they dive at the flash with the rapidity of lightning, while on bright sunny days they are shot as easily as any non-diving birds. On the 12th of October, 1867, I killed two males of this species at a shot. It was a lovely day, frosty in the morning, but the thermometer marked 50 degrees Fahr. at noon, and the ducks which were fishing side by

side, at the distance of about forty yards, made no attempt to dive. "Old Wife" is another provincial name for this species.

Labrador Duck, Camptolæmus labradorius (*Gmelin*).—Probably occurs on some parts of the coast, but I did not meet with it during my stay at Cow Head.

Velvet Duck, Melanetta velvetina (*Cassin*).—Common, and probably breeds on the island, as individuals may be seen throughout the summer; although supposing the birds to assume the adult plumage the *second* year, which I have reason to doubt, they may be non-breeding birds, as they certainly do not breed until the *third* year. Provincial name "Whitewinged diver."

Surf Duck, Pelionetta perspicillata (*Linn.*)—Common, especially during the migratory season. The remarks on the plumage and breeding habits of the preceding species applies equally to this and the following species. Provincial names "Bottle-nosed diver" and "Bald coot."

American Scoter, Œdemia americana (*Swainson*).—Very common throughout the year; at least until driven from the coast by drift ice, which is not usual until the first week in January. It is called the "sleepy diver" and "little black diver" when adult, by the settlers.

American Eider Duck,* Somateria mollissima? (*Linn.*)—By far the most abundant species of duck in Newfoundland, but not so plentiful now as a few years since, owing in a measure to an increase in population, but more particularly to a wholesale robbery of eggs which is carried on with impunity from the islands along the coast, and others in the Straits of Labrador and Belle Isle. Several hundreds of these beautiful ducks breed on some islands in the Bay of St. Paul, about five miles west of Cow Head, and are strictly preserved by an old Englishman, the only human resident in the bay. So abundant were these birds in Newfoundland a few years ago that a man living at Cow Head killed *one hundred and ten* eiders at *two* shots in one day, and on another occasion *fifty-three* at *one* shot: forty, also, had frequently been killed at a shot, and I saw a youth, seventeen years of age, knock down twenty at a shot in January, 1868, but even this last number now is rarely obtained so easily. To the sportsman who is content with a duck to each barrel this comparative scarcity is of

* Professor Newton is of opinion that the American eider differs from the European far more strikingly than do some other so-called American species of ducks (especially the genus *Œdemia*), and I quite agree with him.—H. R.

small import, but to the poor settlers it is a matter of great consideration. The common eider does not breed or assume the adult plumage until the third year: it is called the "sea duck" by the settlers. The young males resemble the females, but lack the tinge of reddish brown which is characteristic of adult females of this and the following species.

King Eider, S. spectabilis (*Linn.*)—The adult male of this species is a large handsome bird and much sought for by ornithologists, especially those who go to the trouble and expense of visiting either its summer or winter haunts. The king eider, which is called "king bird" in Newfoundland, is tolerably common during its periodical migrations, and is frequently shot in company with the preceding species. On the 17th of December, 1867, I obtained an adult male "king bird;" and on the 19th an immature male: the latter was one of two killed at a shot with eight of the common eider. King eiders are more abundant some seasons than others: in 1865 twenty of these birds were killed at a double shot by one of the settlers at Cow Head. Young males the first year resemble the females, but in the second year have the throat and neck copiously spotted with white. The adult female of this species is easily separated from its congener (*S. mollissima*) by its much smaller size, its shorter bill, and by having a more decided rufous tinge on the upper plumage.

Ruddy Duck, Erismatura rubida (*Wilson*).—A rare and uncertain visitor on the north-west coast.

Goosander, Mergus americanus, *Cassin*.—A summer migrant and tolerably common: it breeds on the margins of lakes and rivers, and is called the "gozzard" by the settlers.

Redbreasted Merganser, M. serrator, *Linn.*—A very common summer migrant, remaining in Newfoundland as long as any open water can be found. At early morning the redbreasted mergansers fly out to sea in large flocks, but return to fresh water in the evening: its provincial name is "shell bird."

Hooded Merganser, Lophodytes cucullatus (*Linn.*)—Apparently rare on the north-west coast, and generally obtained in the immature plumage.

HENRY REEKS.

Thruxton, Andover.

(To be continued.)

Ornithological Notes from Shetland.

By H. L. SAXBY, M.D.

1868.

Whitetailed Eagles.—Still build in Feltar and Yell. From the last named locality I obtained two fresh eggs on the 14th April; both were of the usual roundish form, measuring three inches in length by two inches and three-eighths in breadth. In colour they were soiled-white, with a few faint brownish stains. The shells were remarkably hard. The nest was placed in a high sea-cliff, rather nearer to the top than to the bottom, in such a position beneath the overhanging rocks that it could only be reached by means of a rope: it consisted of a mass of dead plants and seaweed stalks, thickly covered about the middle with wool and hair. Although both birds were seen they were very shy, as is usually the case before incubation has fairly commenced. Last year a pair which had newly hatched became a great annoyance in this neighbourhood, although the nest was in an island about eight miles distant in a straight line: so bold did they become that at last they would carry off poultry from the cottage doors, when the men were at the fishing—treating the women and children with the utmost contempt. Some years ago, one of the same pair made a pounce upon a tame duck which was feeding in a barn-yard, but being alarmed by a man who came out to the rescue, merely succeeded in seizing one foot, by which, however, the miserable captive was carried to the distance of about half a mile, "roaring for mercy," as my informant asserted; the eagle then descended to a hillock, and, taking a firmer hold, rose once more and continued its way to the eyrie.

Sclavonian Grebe.—From May 5th to June 18th two Sclavonian grebes, in full summer plumage, were constantly to be seen upon the Voe: they seemed to prefer shallow water among small rocks.

Crossbill.—On the 11th June I saw a crossbill in bright orange plumage at Halligarth, but no others until the latter part of July, when very large numbers appeared at Scaa, in the north of this Island. The inhabitants shot and stoned them by dozens at a time, never having seen birds of the kind before: they were in various states of plumage, but young birds of the year were by far the most numerous: the stomachs of all that I examined contained sand and small seeds. The survivors continued in the same neighbourhood for about a

fortnight, keeping about the corn yards and the small patches of cultivated ground surrounding them, never appearing at Baltasound, although at Scaa there is nothing in the shape of a bush, and even the very weeds are dwarfed.

Turnstone.—On the 13th June I obtained a fine pair of turnstones in summer plumage.

Fulmar and Manx Shearwater.—I have found the jaws of small cuttlefish in the stomach of both these birds. (See Mr. Gurney's notes, Zool. S.S. 1483—1603).

Quail.—On the 25th September a woman brought me eight eggs of the common quail, which she had just found while reaping a small field of oats. She stated that a few weeks previously she had observed a bird resembling a small landrail in the same field, but as it suddenly disappeared it was supposed to have been killed by a cat: there were ten eggs in the nest, but two were accidentally broken; the eight now in my possession are of the usual dingy yellow, blotched and speckled with various shades of umber-brown; the average size is one inch two lines in length by eleven lines in breadth; all were addled. I have not heard of the occurrence of the quail in any part of Shetland.

Spotted Woodpecker.— After an absence of eight years the spotted woodpecker (*Picus major*) has again visited our islands. On the 26th of September I heard of one at Uyeasound, and within the next few days others were seen in all parts of Unst. Many specimens, both males and females, were sent to me, but none were in adult plumage. Upon the occasion of the last visit of this species (Zool. 7932) there was one adult bird, and all that I examined were males. The latest specimens received by me had the bill, tail and claws much worn: one was caught alive and placed in a herring-barrel, but climbed out of it with ease, greatly to the astonishment of the beholders. This flock, like the last, appeared with a steady S.W. wind.

Hedgesparrow.—On the 5th of October (wind S.E.) I observed a hedgesparrow—a bird until that time unknown in Shetland—in the garden at Halligarth.

Greenfinch.—On the 13th of October a flock of many hundred greenfinches arrived at Halligarth. Wishing to obtain specimens without causing unnecessary slaughter, I resorted to a very effectual method of obtaining a number of living birds from which to make a selection: visiting the roosting places after dark a companion threw the light of a bull's-eye lantern upon the birds, while I crept softly

behind them and seized as many as I required in my hand, slipping each one as it was captured into a covered basket. Although none of the trees exceed fifteen feet in height, they would still have been too tall for us had not the birds chosen the branches below the level of the wall top, for the sake of avoiding the cold wind. The result of our last attempt was the capture of twenty-seven greenfinches, two house sparrows and a chiff-chaff: several times we caught bramblings and chaffinches. When the greenfinches first appeared the wind was N.W., but for some days previously it had been blowing strongly from S. and S.W.

Siskin.—On the 15th of October, during a gale from S.W., a siskin was shot on the jetty below Buness.

Goldeneye.—On the morning of the 27th October a woman brought me a female goldeneye, which she had caught about an hour before in a burn which runs out of the Loch of Quoyhouse: her attention was first attracted by a frequent splashing in the water and the eager behaviour of a dog which was running up and down the bank, evidently on the watch for something—a large fish, the woman imagined: running to the spot where it last disappeared, she indistinctly saw some dark object near the bottom of the channel, when—still supposing it to be a fish, for the ripple was very strong—she plunged in her hand, and to her surprise brought up a bird. On my questioning her, she told me that it held quite tightly to the weeds, and "came up feet foremost." From this, and also from the fact that the head was pointing towards the upper part of the stream, there can be no doubt that the bird was holding on to the weeds, though whether the bill was above the surface or not is uncertain: the plumage was so saturated with wet, probably from the extremely heavy rain, that flight was impossible, otherwise the bird would have escaped by flight. I kept it living for some time: when irritated it erected the feathers of the whole head, causing that part to appear disproportionately large. In a former volume of the 'Zoologist' (Zool. 9436) I have recorded a remarkable instance of the escape by diving of a bird of this species.

Longeared Owl.—On the 28th October, a strong N.W. wind brought a longeared owl to the garden at Halligarth, where, after some little trouble, for it was very shy, I killed it several days afterwards. It proved to be an adult female: the stomach was full of mice—a fact at which I was surprised, for at that time the garden was swarming with small birds. The longeared owl is another addition to the Shetland list.

Oystercatcher.—An oystercatcher was seen here on the 11th November, and another on the 25th December: it is very seldom indeed that it is seen here in winter, although it is resident in Orkney throughout the year (See Zool. 9091).

Albino Starling.—I am informed by the Rev. D. Webster, minister of Fetlar, that, during the early part of the winter, he repeatedly observed a pure white starling. Macgillivray states that he has "not seen any British specimen either white or spotted with that colour," while Yarrell believes such varieties to be "not uncommon."

Gannet.—During the month of December a considerable number of gannets appeared here, all of them in adult plumage: one which I had wounded, finding itself unable to rise, rushed open-mouthed at the boat, never stopping until it had driven its bill against the planks. Several of these curious birds were caught inland, but in almost every instance they contrived to inflict rather severe cuts upon the hands of their captors.

1869.

Rook.—On the 2nd March (wind N.E.) three rooks were seen at Buness.

Peregrine Falcon.—Four fresh eggs of the peregrine falcon were brought to me from Burrafirth on the 24th April.

Snowy Owl.—A snowy owl was shot at Crushafiel on the 12th April.

Crane (Grus cinerea).—On the 11th May I heard that two cranes were in the island, but my endeavours to obtain even a sight of one were unavailing until the evening of the 27th, when one of them was brought to me by a boy, who said that he had killed it near Uyeasound: he stated that, seeing some people chasing it over the moors, he joined in the pursuit, and, being a swift runner, pressed it so closely that it turned and attacked him, upon which he threw two large stones, the second of which struck it upon the head and killed it; he then discovered that the wing had lately been broken, probably by a shot. Several men and boys have since told me that they saw the bird running over the moors, but were unable to overtake it. The following measurements were taken before skinning:—

Length, from middle claw to tip of bill	4	feet	8½	inches.
„ from tail to tip of bill	3	„	8½	„
Expanse of wings	6	„	8	„
Wing, from carpal joint to tip	1	„	9	„
Bill, from front to tip	0	„	4⅛	„
Tarsus	0	„	9¼	„
Middle toe and its claw	0	„	4¼	„

Sex, male.

Bill light greenish horn-colour, slightly darker about the middle of both mandibles; base of upper, and a larger portion of base of under mandible brownish pink.

Iris brownish orange, darker towards the pupil.

Feet tarsi, and bare part of tibiæ black, tinged with olive-green; the under surface of the feet paler; claws black.

Bare parts about the forehead and eyes dull, pale crimson.

The plumage is very similar to that of the last specimen (Zool. 9767), but less clouded with brown. In this individual, also, large patches on the feathers beneath the wings are covered with the ova of parasites.

I am unwilling to resume my monthly notes without apologising to my ornithological friends for having left many kind letters unanswered. Having mentioned to the Editor, in a private communication, the cause of my late temporary abandonment of my favourite pursuit, I can only trust that by inserting this he will signify his belief that, notwithstanding my long silence, my good wishes for the 'Zoologist' and its readers still continue unabated.

HENRY L. SAXBY.

Baltasound, Shetland, May 31st, 1869.

Marine Animals in Fresh Water.—A somewhat personal discussion has recently taken place in the columns of the 'Athenæum' between Dr. Wallich and Col. Stuart Wortley respecting the possibility of cleaning the sheeting of foul ships by a temporary immersion in fresh water. The practicability of this proceeding is stoutly denied by Col. Wortley, whose views are ably supported by Mr. W. A. Lloyd, of the Hamburg Aquarium. In his last letter published in the 'Athenæum' of this week, Mr. Lloyd gives the following interesting details respecting the residence of marine animals in fresh water, and also regarding the residence of fresh-water animals in sea water:—"The abstract fact of certain marine animals being able to live occasionally or entirely in fresh water, is an interesting one, apart from its direct commercial bearings. We all know that the salmon, which breeds in rivers, goes into the sea to feed, and that the smelt, which is regarded as a sea fish, not only visits rivers during certain periods of the year for spawning purposes, but that it has been kept for years continuously in a fresh-water pond without ever going to sea, and that under these circumstances it has thriven well, has abundantly multiplied, and has not deteriorated for table purposes. So, too, the sturgeon, which lives in the sea, and at great depths, is found commonly in rivers of the Continent of Europe; and more than that, it has been kept for years in freshwater ponds in the Zoological Gardens of London and Hamburg. In the latter place it has *grown* amazingly as well, and with it there is now, in the same pond, a large sea lamprey (*Petromyzon marinus.*) This lamprey has been in the pond since 1865, and yet (on the authority of Mr. L. Lloyd, the excellent

Scandinavian naturalist) its near relative, the hag (*Myxine glutinosa*), is killed directly by fresh water. Plaice, flounders, and soles, all three of them marine fishes, are known to live permanently and to attain excellent condition in fresh water. The prawn (*Palæmon*), a well-known marine crustacean, has been repeatedly brought to me by hundreds and thousands, alive and well, in perfectly fresh water, and I have transferred them to their natural sea water in aquaria without any gradual preparation, and without doing them any harm. I have known the common shore crab (*Carcinus*) and the American horseshoe crab (*Limalus*), both marine, to run about a garden for days, moistened only by rain. Oysters may be seen daily in shops in London, alive and well, immersed in fresh water. Indeed, it is evident that a large number of marine animals and plants living between tide-marks, must be capable of enduring unharmed the heavy rain which frequently falls upon them uninterruptedly during the recess of the tide; and among such creatures, and so rained upon, few are more common than the sessile barnacle which infests ships' bottoms. I have found a marine alga (Ulva) growing in the River Thames at Greenwich, where the water is practically fresh, and yet another marine alga (*Griffithsia*) is instantly killed by being plunged in fresh water, its colour being at the same time discharged. Mr. L. Lloyd mentions three marine fish which in Sweden and Norway are also found in fresh water, namely, the cod, the whiting, and one species of Cottus. But, on the other hand, there certainly is a large number of marine animals which fresh water, or even weak sea water, does kill almost immediately, as Dr. Wallich says. For example there is a well-known passage in the late Professor Edward Forbes's "History of British Star-fishes," in which he relates how certain marine animals he was dredging for were paralysed in being drawn through a thin layer of surface fresh water floating on the sea-water below. But, among the marine animals on which fresh water is supposed to act as a certain poison, none have been so constantly quoted as sea anemones. The late Dr. George Johnston, in his 'History of British Zoophytes,' 2nd edit. 1847, p. 239, says, "These creatures, almost indestructible from mutilation and injury, may be killed in a few short minutes by immersion in fresh water." This work was the accepted authority on these animals for some years before the introduction of aquaria, but it is now almost useless, as far as sea anemones are concerned, and this almost universally accepted statement of Johnston's is certainly incorrect, for I have known specimens of Actinea Mesembryanthemum thrown away by mistake as dead, and afterwards be found brilliantly expanded in a puddle of rain-water in a London garden. Mr. Gosse has lately recorded a sea anemone living in India, in one of the mouths of the Ganges, where the saltness of the water is only about ten parts in a thousand, instead of thirty-five parts, as on the coast of Britain. These animals are also found in the Baltic Sea, where the density is only about fifteen in a thousand. The Fauna of the Baltic is a singularly mixed one. Thus among a large number of truly marine animals (some in no way differing in size from those in the neighbouring North Sea, but others much dwarfed), may be seen swimming the common fresh-water perch, and two species of the common fresh-water stickleback, and of these two, the perch will live if transferred to quite fresh water, and will die if put into quite sea water; while the two sticklebacks will live quite well if removed from the Baltic water and be placed in either fresh water or fully dense North Sea water. But there is a deep purple variety of the common North Sea star-fish (*Uraster rubens*) living in the Baltic which is killed directly on being placed in North Sea water; and by no gradual

process of acclimatisation have I ever succeeded in getting it to live in the denser fluid. Whelks and some other mollusks from the Baltic Sea are also killed by North Sea water, but not so constantly as the echinoderm I have named; while I have never found any marine fish in the Baltic which will not live in North Sea water in aquaria. The recorded instances in which truly fresh-water animals have permanently lived in sea water are less numerous than those in which marine creatures have been known to live in fresh water. I have already named two sticklebacks, and I have to add that the common fresh-water eel does very well in marine aquaria in Hamburg. One very curious example occurs to me; there is a byssus-making fresh-water bivalve (*Dreissinia polymorpha*) found abundantly around London, and sometimes choking up London water-pipes. This shell is stated to have been introduced from Asia Minor about fifty years ago, attached by its threads to the bottoms of ships: and in this manner it must have been dragged unharmed through thousands of miles of sea water."

Zoology of the Swedish Arctic Exploration.—Arctic explorations have been conducted with much energy and success by other nations than our own. Four expeditions have been carried on by Swedes, and an account of the fourth of these was presented to the Royal Geographical Society at its last meeting, in a paper written by A. P. Nordenskiöld. The expedition had chiefly scientific objects, and it was at first intended that some of its members should winter on Seven Islands to the north of Spitzbergen. The ship, the Sofia, was fitted out at Carlscrona, and touched at Gottenburg, to take in the scientific members of the expedition. The Sofia started in the beginning of July, 1868, and on the 6th of that month landed at Bear Island. This island has a desolute plateau from 50 ft. to 100 ft. in height. Its two chief hills are called Mount Misery and Vogelberg. Numerous birds are found on the island. The cliffs are precipitous, and there are many small lakes on the plateau. Heaps of stones, suggestive of moraines, are found; but the members of the expedition satisfied themselves that these stone heaps are produced by the action of frost and water, and not by the effect of glaciers. A few cryptogams were the only vegetables found. The birds of the island are already well known; the chief additions to knowledge that were made by this visit were with regard to Marine Flora and Zoology. Several Brachiopoda were brought from Bear Island. Coal, of an age not determined, was found; and also Calamites, Lepidodendra, &c. On the 27th of July the expedition left Bear Island, and went towards the south of Spitzbergen. Ice was met at South Cape; and the Sofia had to go to the west of Spitzbergen. In 1868 the whole of the east of Spitzbergen was inaccessible on account of ice. The Sofia anchored in Ice-fiord, and interesting facts were ascertained with regard to the geology of the fiord, which was already known, but not very fully. Norwegian vessels go to Spitzbergen to find the walrus, and also to hunt the reindeer. Between two thousand and three thousand head of reindeer are annually killed in Spitzbergen: for their maintenance there must be a considerable extent of meadow land, and the fact that such great numbers are killed suggests a possibility of their immigration from Nova Zembla; but the great distance of the latter place from Spitzbergen renders this highly improbable. The water of the Ice-fiord is clear and beatiful in summer, and the fields on the shore are covered with poppies and saxifrages. On the 13th of August the Sofia left Ice-fiord, and went northward, looking for coal in King's Bay, where it was not obtained, and then going to Amsterdam

Island, where a coal depot had been established. It was then determined to try whether the east coast of Greenland could not be reached; but the ice utterly prevented the effecting of that purpose. At this time lat 81° 16′ N. was reached. Soundings were made both north and south of Spitzbergen, which resulted in the important discovery that that island is a mere continuation of the Scandinavian peninsula, the water to the south of Spitzbergen never having a greater depth than three hundred fathoms, while north of it the ocean is two thousand fathoms deep. From this depth clay was brought up containing not only microscopic animals, but also Crustacea. From a depth of two thousand six hundred fathoms very small Foraminiferæ, white and red, were brought up. Drift wood was discovered in lat. 80° 40′ N., and hollow glass balls, which are used as floats by the Loffoden fishermen. These prove the continuation of the Gulf Stream to the northward. In the beginning of September, Gilles Land and Amsterdam Island were visited, and a number of the collections forwarded to Stockholm, to be deposited there and in Gottenburg, in the museums. Sept. 16 found the Sofia again trying for the Seven Islands; but the ice prevented the journey. However, in 17½ E. long. (Greenwich), lat. 81° 42′ N. was reached, point which the people on board the Sofia considered to be the farthest north ever reached. The ice, which prevented any further progress to the north, contained stones, and was black with gravel, indicating that it came from land, and giving the idea that there might be land far to the north. The coal depot was again returned to, and the coal had to be dug out from under the snow. Once more, notwithstanding the lateness of the year, the Sofia tried to proceed farther north, and again reached 81° N. Here the ship was driven on a berg, and a leak sprung, which was of so dangerous a character that, when the Sofia arrived back at Amsterdam Island, the water was two feet deep in the cabin. After this accident, farther polar exploration was impossible. One of the chief objects of the Swedish expedition was to ascertain whether in the autumn it might not be possible to reach a point farther north than any that has yet been attained, and so to contribute to the solution of the question as to the possibility of an open polar sea. The officers of the expedition concluded that it would not be possible, even under the most favourable circumstances, ever to reach farther north than 83° N., even if that could ever be reached by the Spitzbergen route; and they consider that the best chance of reaching the North Pole will be by sledge expeditions starting from Smith's Sound or some similar place.

Flight of Butterflies, Moths, &c.—First as to the height to which they ascend. "Benares, June 17, 1863.—This morning, whilst sitting in the verandah of Mr. Smith, P.S.A., I observed a large moth, Anisoneura hypocyana, fly into the place and settle inside on the sloping roof: I at once sent for my insect net, and placed it over him; but, from the unevenness of the bamboos, he escaped me and flew out of the verandah. Again he sought shelter under cover, and my man struck at him with the net; he only hit the body of the moth with the bamboo ring, and alarming him very much, caused him to fly out of the verandah and steadily upwards in the air,—"towering," as it is called, with birds. The sky was of the clearest blue, with a few light white clouds, and four of us were watching him. A swallow, H. Davurica, made a dash at him, but without the slightest effect: higher and higher he went, until we lost sight of him; although, owing to the background of white cloud, we could see him for a very long time. When he got very high, a large black swift (*Cypselus affinis*) contended with

him, but could not seize him, for we saw the bird leave him and he still ascending. My native servant remarked, on seeing this—'See! he has gone so high that the bird cannot get up there, but has had to come down again.' The ease with which he rose to this great height and the rapidity of the ascent were astounding. In reading the above, it should be borne in mind that this moth measures 4½ inches across its expanded wings, has a very stout body, and is of great strength, so that neither swift nor swallow could take it in its gape. I remarked that it was attacked three times by a Cœlyoxis apicata whilst sitting in the verandah, but for what reason I cannot say."

Now, as to speed and endurance of flight of butterflies and other insects. "Pera steamer, Oct. 12, 1860.—About twelve miles east of Cape Bon, Africa, when sitting in the after part of the vessel, I observed a 'painted lady' butterfly. It appeared to come from seaward, and readily overtook the steamer, which was then making 10½ knots an hour. I observed the insect for about twenty-five minutes, during which time it made three distinct flights from the ship, and each time *appeared* to alight on the waves; the wind was nearly ahead, and the log was heaved at the time, whereby the rate of speed was settled. The insect often soared high, and did not seem at all fatigued.

"Oct. 29th.—Six hundred miles from Aden a butterfly flew on board, probably from Socotova.

"Oct. 30th.—A dragon-fly came to hand, 800 miles from the nearest land: two swifts and a swallow also came on board.

"Nov. 4.—A small finch; also a dragon-fly darting about, and keeping with ease with the vessel; a dark brown butterfly, like a leaf-butterfly, easily keeping up; a pigeon and two hawks also came. This last butterfly kept up bravely, although the wind was against us—say, at least three or four knots an hour, whilst we were steaming at from nine to ten knots."

I have often noted butterflies keeping up with an Indian railway train, going at the rate of about twenty-eight miles an hour, with the greatest ease, for a considerable time; as also moths. In the case of the former they were at some distance from the train, but the latter were generally close, so that they (the moths) may have been influenced by the current of air, and so carried onward. I am well aware that some butterflies travel fifty or sixty miles an hour for short distances, and I trust that these few notes may elicit others from some of your correspondents, many of whom, I doubt not, are reading with interest the curious experiments occasionally recorded in 'Scientific Opinion,' which are now being made to ascertain the rapidity with which the vibrations of the wings of insects occur.—*C. Horne; Upper Norwood, June* 4, 1869.

Rare Bats at Torquay.—Two uncommon bats were killed near Torquay in May, viz., the great bat (*Noctulinia altivolans*) and the barbastelle (*Barbastellus communis*). The former measured in expanse of wing 13½ inches: both these bats were females. Last year (I forget the month), in the same neighbourhood, a number of the great horse-shoe bat (*Rhinolophus Ferrum-equinum*) were found in a cellar which was tolerably often resorted to.—*A. de Hügel; Florian, Torquay, June* 6, 1869.

Two Tiger Stories and one Elephant Story.
By R. THOMPSON, Esq. *

TIGERS REPULSED BY A BULLOCK—TIGERS EATING PORCUPINES.

ABOUT five years ago, when I was pitched at Ramnuggur, on the Kosilla river, I was called up one morning, about two o'clock, by a couple of native ghoteeas, or cow-herds, who had to tell me of a tiger that had broken into their cattle shed that night; of a bullock he had killed, and of his being there crouching behind the carcase of the dead beast up to the time of their leaving for my camp.

The shed was about two miles from my tent: I started with the men at a swinging trot, which brought us up to the place in about half an hour. On being pointed out the shed, there were several standing closely together on a bit of cleared spot in the jungle; I went up to where there was a hole in the side of the grass wall: this was made by the men who were inside along with their cattle when the tiger had entered. On hearing the row which he made in strangling the bullock, they had rushed out, breaking their way through: escape by the doorway was entirely cut off to them, by the tiger taking up his position near it.

When I went up to the hole, putting my head in I was greeted with a savage growl: I then got a torch made of a handful of lighted grass, and, advancing inside, saw the head of a large full-grown male tiger; he was so crouched behind the carcase that a fair shot was impossible. I then looked about, and seeing a 'muchan,' or place raised above the level of the floor to stand milk upon to sour, I gave the torch to a cow-herd, and told him when I gave the signal he was to place it on the floor, put a handful more of grass over it and bolt: the muchan was low enough, but I had considerable difficulty in scrambling clear of the pots, pans and milk-jars. Crouching in amongst these, and lying as closely down as possible, I managed to conceal myself pretty well: I then gave the signal: the cow-herd did as I had told him, and bolted to join his fellows at the other sheds. During the whole of the time occupied in arranging matters, the tiger was keeping up a continuous growling, and more than once I suspected he was going to charge, as he was only forty paces from us; but why he did not I cannot tell, nor can I imagine why he did not

* Communicated by Charles Horne, Esq.

escape when we entered with the torch-light : the hole he broke through at was just behind where he was crouching, and nothing but excessive hunger could have caused the beast thus to defy us all. Managing to screen myself, and keeping perfectly still and quiet, and the tiger thinking it all safe, I had the satisfaction of seeing him raise his head, then stand up and make towards the rump of the bullock: his object was evidently to feed, but in this he was singularly disappointed, by a daring charge made at him by a fellow bullock tied not three paces off from the dead one. The tiger growled and retreated as suddenly as the charge had been made: I became interested to see what next: the tiger again got up, and was again repulsed by the heroic little bullock. My torch was in full blaze, and in a few seconds more I knew it would burn out, so I determined to have at the tiger the next time he showed himself: he was not long in giving me the opportunity; I aimed for his head just behind the ear—he was hit in the exact spot, the ball passing out by the other ear; he dropped, and as suddenly started up, seized the dead bullock by the ribs, and shook it as if it were merely a rat. I fired my second at his shoulder, just behind the knuckle-bone; it was for his heart I designed the bullet this time, and unerringly it performed its mission: the tiger let go his hold on the dead bullock, fell on his back, got up and dashed right into the middle of a lot of buffaloes that were tied at one end of the long shed. The buffaloes started up, broke loose and madly rushed about the apartment; and picture my situation for a moment! The wounded tiger was right in front of me; mad buffaloes all round me; the torch had gone out, and I had nothing for consolation but a pair of empty rifle-barrels! I lay perfectly still, for therein I deemed my safety: at last I heard the death-rattle in the tiger's throat; I felt sure now that he was powerless, and forthwith called out to the herdsmen to come and let the cattle out: this was done, and the dead tiger picked up—he proved to be a male of enormous size.

On skinning my beast, I found that the whole of his fore arms were pricked with porcupine quills, which he could only have got when striking at that animal: some of the quills I found buried in the tarsal bone, others had got fixed in the sinews and fleshy parts of the fore arm; but the tiger had bitten off all the ends nearest the skin. He was evidently in great distress from these, as his emaciated appearance and the festered wounds the quills had caused made evident.

Both tigers and leopards will kill and eat porcupines, especially the leopards, who are very fond of them; and I have as a rule, and

not as an exception, found the quills buried deeply in their flesh in a transverse direction.

An opinion prevails with many persons that the quills are swallowed, and eventually work through the system out to the extremities: I cannot but doubt this in the case of larger and thicker quills, which are always carefully removed from the animal before it is eaten. Quills of the size and thickness of hogs' bristles I have invariably found in the tissues of the skins of both tigers and leopards; also hogs' bristles and the stiff hairs of other animals; but never a porcupine quill big enough to cause serious distress to the animal swallowing it. That it is easy enough for a tiger or a leopard, when taking hold of a porcupine, to get a number of the quills into its body by the simple resistance which the latter offers, any one who has seen a living porcupine can easily imagine—from the way it spreads out all its armaments, turning its head away from the front of the enemy, and presenting its bristling posterior, a living *chevaux-de-frize* to receive the brunt of the blow.

A CANNIBAL TIGER.

I used to get frequent 'khubber' of a tiger and tigress on the Bhogpore estate near Nujjeemabad. I went more than once, with a party of others, to look for the quarry, but besides finding numerous fresh tracks on the sandy bed of the Malun river, we never got sight of the game; till one afternoon we, a party numbering four, mounted on a couple of pad elephants, came upon remarkably fresh tracks of both tigers: I got down and tracked, which was easy enough on the sand. After leaving the bed of the river, the animals made their way into thick tree jungle: here I stopped and mounted my elephant; my dogs, some four or five, were amusing themselves by putting up and chasing cheetul and hog-deer. It was during a chase of this sort that I caught sight of the tigress springing out of a bush, and with a single stroke of her paw kill the leading dog on the spot: she stood over the body of poor Rover, smelt his carcase, and walked deliberately away: we followed, and, after a hot chase which lasted over fifteen minutes, the tigress doubled and was lost sight of.

The following evening, the same party being out, we neither saw nor heard of the beasts till late in the evening, when a magnificent roar told us where the royal game could be found. The tigress (she was again foremost and leading) came right upon our view, stalking an extensive plain: hearing our approach she stood, growled, and

then gracefully bounded away into a patch of high grass: it was too dark to hunt her out of this.

Our third evening's expedition revealed other members of this interesting family; there were two about one-third grown, and who had up to this kept themselves quite in the background. Monkeys, in their case, betrayed the paternal domains, from the incessant chatterings with which they greeted the appearance of the juvenile tigers whenever they, in the exuberance of animal spirits, came out to gambol on the sands of the Malun. My practised ear caught the well understood chattering, and our party at once drove off to the place. It is needless to go into further details—we found the youngsters, and mortally wounded one: it was getting dark when we found them, and as the wounded fellow had managed to take cover in enormously thick and tall grass, we left him here that evening.

The following morning, proceeding to the spot, we were struck with the appearance of fresh marks of the huge male: these we followed, but, before starting the trail, I arranged a number of men on trees commanding the approaches to all the likely looking pieces of tall grass, determined, now that we had the fresh tracks of the male, and a whole day before us to look for him, to spare no exertions in hunting him down. It was necessary to place men in trees to watch, as, with our two pad elephants, we could neither do the driving to perfection nor see the tiger whenever he moved in the tall grass, which in some bits was nearly on level with our heads; so had to depend on our watcher to give us the direction whenever he moved.

The tracks, after leading to various little glades and salt licks, the usual resorts for deer, returned and entered the patch of tall grass in which we had left the wounded youngster of the previous evening. Having seen the gentleman to his door, and thinking discretion the better part of valour, I mounted my pad: the elephants, on being driven in, began with their short grunts and evident restlessness, plainly to indicate that master tiger was to be found at home. Once down the line—twice beat back again—a third time obliquely with the two first,—but no tiger. Somebody, however, happening to look down into a hole just then, perceived something like the head and feet of a tiger: a halt was immediately called, and examination proceeded with, when—what was it? but the head, two fore feet, one hind leg and tail of the young tiger we had left in that grass the previous evening. I closely examined the ground, collected all the evidence from marks, &c., left by the big male, and the conclusion was

that he had forgotten natural consanguinity of relationship, and in a fit of hunger had eaten his own helpless progeny!

From the spot where the beast had feasted on his own young, I steadily tracked him to a patch of tall grass some two hundred yards off, and which I at once knew, from the direction he took, he had made for to get water. This piece we commenced to beat, as before, in line: we had not gone ten yards into it, when my second elephant gave the usual grunt, indicating that she had smelled an unsavory smell. At this juncture I saw the grass wave in front of said elephant slightly, and as if caused by some lithe animal moving cautiously: I kept it in view—we drove on—and, horror! there was such a roar as to cause us all involuntarily to stand still and hold in our breaths, elephants and all. Roar succeeded roar—there was evidently a fight aud a deep struggle going on; the grass was being violently moved in a central part of the bit we were beating, and for the first five seconds all was bewilderment with us. The roaring and struggling lasted about a minute, when all became still: we, the sportsmen, looked into each other's faces, and then towards the spot; at last one suggested that the male tiger we were in quest of had bagged a pig, which, disturbed by our line, must have gone near him, and the roaring and struggling was the consequence. This to all of us seemed so natural a hypothesis that we adopted it at once, and forthwith proceeded to hunt for the tiger, which we were now sure of finding. Coming up to the place of the fight we started the identical huge male; but what was that he was carrying in his mouth?—what, why his second youngster! The poor wretch had also taken refuge in the grass; we had put him up on entering the beat; he had glided along, probably unconscious of the vicinity of his unnatural father, had slept upon his lair and was bagged for his temerity. The old cannibal no doubt had the relish of the night's supper fresh in his mind's eye, when he saw young hopeful within his clutches.

I will not prolong the story: suffice it that after heavy beating through grass, which in some places was taller than our elephants, with tact and management, materially assisted by the men whom I had set to watch, and after getting a jolly spill off the elephant when she was charging the tiger, I had the honour of bagging my gentleman with the first shot fired at him from my rifle. He was a full-grown tiger, measuring ten feet with his coat on, and twelve feet six inches when it was taken off and stretched between two men holding either extremity. The young tiger, which was so unnaturally polished off,

was picked up quite dead; the throat was frightfully lacerated, and the left shoulder with its scapular bone was entirely crunched to pieces: the little fellow fought well, and left a deep wound on the fore arm of the big male.

I was curious to know whether we could find traces of the young one eaten the night before in the stomach of the old fellow: we had him opened, and the contents of his stomach examined: his having practised cannibalism was beyond all controversy, for there were huge pieces of flesh with skin and hair entire, in a state of semi-decomposition, taken out of it.

I subsequently bagged the tigress, with great difficulty; and thus perished the whole family of tigers of Bhogpore.

FEMALE ELEPHANT CARRYING HER YOUNG.

A large single male tusker that I had been stalking the whole day made off and joined a herd of seven full-grown females and three young ones; one of the latter was, apparently, only a few days old—a little overgrown pig-looking sort of thing. When in the herd the tusker appeared more easy, and I was able to get within shot: I killed him with the first bullet; he dropped dead in the middle of the herd. There was a rush; some of the females even attempted, finding he did not follow, to return and assist him up by pushing at him with their trunks. My brother and a party of five natives were on the opposite side of the valley waiting for the tusker, in the event of his not being killed and going that way. The female herd, finding the tusker did not follow, broke up the valley in the direction of my brother's party: I called out to him to look out as the herd was coming full spell on the top of them. He and his party had just time to leave the well-worn track made by these sagacious creatures throughout the forests when the herd came up: the other females and older young ones, seeing the party before them, swerved and breasted the hill, leaving the old mother elephant and her newly-born progeny to struggle up after. The sagacious creature stood, threw dust and rubbish at a dog which had run up to attack the young 'hathee' (elephant), and then taking the little fellow up by the trunk, she put that organ into her mouth and magnificently strode up the hill after the receding herd, with young hathee dangling like a pendant in the air. It was the most comical, and yet the most astonishing sight we had ever witnessed; and as a fact in the natural history of these animals, I think it stands unique.

The tusks of the male weigh seventy-five pounds, and each is four feet four inches long, and sixteen inches girth round the thickest part: they can be seen now at my house.

R. THOMPSON.

Forest Lodge, Nynee Tal, July 31, 1867.

Extracts from the Report of the Council of the Zoological Society, read April 29, 1869.

IT seems desirable to reprint in the 'Zoologist' those portions of the Zoological Society's Report which have especial reference to the state of the collection, while the statistics of income, expenditure and attendance are of less general interest.

The number of visitors to the Gardens during 1868 has been 573,186, being an increase of 16,972 over last year.

The number of animals living in the Society's Menagerie has not varied greatly since the issue of the last report. The following are the corresponding numbers at the close of the last four years:—Quadrupeds, in 1865, four hundred and ninety; in 1866, five hundred and thirty-five; in 1867, five hundred and thirty-one; in 1868, six hundred and sixteen. Birds, in 1865, one thousand three hundred and sixty-five; in 1866, one thousand three hundred and five; in 1867, one thousand three hundred and twenty; in 1868, one thousand two hundred and twenty. Reptiles, in 1865, one hundred and one; in 1866, one hundred and seventy-three; in 1867, one hundred and fifty-nine; in 1868, one hundred and thirty-four. There have, however, been some very remarkable additions to the collection during the year 1868, as the following list of the principal novelties will show:—

A young caiman from Paraguay, presented by George Wilks, Esq., February 4th. This specimen was determined by Dr. Gray as belonging to his species *Jacare longiscutata*, and was of interest as indicating the true *patria* of this rare species.

A smooth-headed capuchin monkey (*Cebus monachus*, F. Cuv.), remarkable for its large head covered with short recumbent hairs, very different from those of the *Cebi* ordinarily seen in the Society's Menagerie, where this species is believed to have never been exhibited

before. The present individual was deposited by Mrs. Pascoe Dupré Grenfell, on the 26th of February.

A thicktailed opossum (*Didelphys crassicaudata*, Desm.), from the Argentine Republic, presented by George Wilks, Esq., March 5th, being a fine example of this rare species.

A burrowing owl (*Pholeoptynx cunicularia*, Mol.) from the same locality, and presented by the same donor. No sooner was this bird placed in its cage than, true to its habits, it excavated a hole in the soil at the bottom, into which it always retreats when threatened.

A wrinkled hornbill (*Buceros corrugatus*, Temm.) from Borneo, obtained by purchase on the 27th March.

A male example of the Bornean fire-backed pheasant (*Euplocamus nobilis*, Sclater, Proc. Z.S. 1863, p. 119, t. xix), obtained at the same time, and believed to be from the same locality.

A white-billed parrot (*Tanygnathus albirostris*, Wallace, Proc. Z.S. 1862, p. 336) from Celebes.

A male lyre-bird (*Menura superba*), presented by the Hon. John Ellis, April 21st, making up a pair of this extraordinary bird then living in the Society's Gardens.

A specimen of the rare marmozet monkey (*Hapale argentata*, Linn.), purchased of a Liverpool dealer, and stated to have been received from the Amazons.

A pair of the wild ass of the Syrian deserts (*Equus hemippus* of the late Isidore Geoffroy St.-Hilaire), of much interest as rendering the Society's series of the living species of this group complete. This pair of animals was obtained by exchange from the Jardin d'Acclimatation, Paris, on the 2nd of May.

A young male of the regent bird (*Sericulus chrysocephalus*), purchased on May 14th, being the first specimen of this remarkable bird that has reached the Society's Gardens alive. The Society's correspondent, Dr. F. Mueller of Melbourne, had previously forwarded a living example of this bird, which, unfortunately, died in the vessel after it had reached the docks.

An African fruit-bat (*Cynonycteris collaris*), which had been captured at sea off the St. John's river, Natal, March 1st, 1868, and was purchased the 27th of May. This animal is placed in the monkey-house along with the Indian fruit-bat (*Pteropus medius*), which has been living in the Society's Menagerie ever since October, 1863.

A pair of the beautiful green hunting-crow of Northern India

(*Cissa venatoria*), purchased June 2nd, and believed to be the first examples of this form received alive in Europe.

An Australian fruit-bat (*Pteropus poliocephalus*, Temminck), from New South Wales, presented by H.R.H. the Duke of Edinburgh, July 4th.

A young male Koodoo antelope (*Strepsiceros kudu*), purchased July 16th out of a large collection of living animals made by M. Casanova in the vicinity of Casalá, Lower Nubia.

A young female of the Spanish ibex (*Capra pyrenaica*, Schimper), presented by Major Howard Irby, August 10th. Another correspondent of the Society has promised to supply a male of this interesting species.

A very fine young female of the Hoolock gibbon (*Hylobates hoolock*), presented by Mr. A. Grote, F.Z.S., August 14th, who has communicated to the Society the following note respecting this animal.

"This hoolock was sent to me early in 1867, by Mrs. Driver, of Gowalpara, a civil station on the western border of the Assam province. The animal is common in the jungles of the Gowalpara district, on the left bank of the Barhampooter; and its young are frequently captured by the natives and brought into the station, though, being impatient of confinement, they are not usually, so far as I can learn, kept alive for any time. Those which are sent down to Calcutta seem very sensitive to the change of climate, and are generally carried off by pulmonary disease. The individual which I brought home was attacked within a week of her reaching me at Alipore, and would probably have succumbed but for the unremitting attention of Dr. John Anderson, the Society's agent in Calcutta, to whom I had made her over. She was for more than a year in the Botanic Gardens, and, being allowed a good deal of liberty there, kept her health very well. She has grown considerably since she was first sent down to me."

A specimen of the large white crane of Upper India (*Grus leucogeranos*), presented by the Babu Rajendra Mullick, of Calcutta, August 14th.

A young female sea-lion (*Otaria jubata*), from the Falkland Islands, received August 24th.

This individual was the only survivor of eight examples of this animal captured in various spots on the coast of the Falklands by Adolphe Alexandre Lecomte, the Society's keeper, who was sent out

there by the Council of the Society for the purpose of obtaining living specimens of it.

A young male African two-horned rhinoceros (*Rhinoceros bicornis*), purchased September 11th. This animal, which is believed to be the first individual of the species which had reached Europe alive since the days of the Romans, was purchased for the Society of Mr. Carl Hagenbeck, the well-known dealer of Hamburgh. It was originally captured on the 12th of February, 1868, by the Arabs of the Beni-Ammer tribe, in the vicinity of Casalá, in Upper Nubia, and was sold by them to Herr Casanova, an enterprising traveller of Vienna. Pending the completion of the new house for rhinoceroses and elephants, now in process of erection, this rhinoceros is temporarily lodged in the giraffe-house.

Two specimens of the dotted-jawed caymen (*Jacare punctulata*), obtained in the Island of Tobago, and presented to the Society by Capt. Spicer, of the ship 'Mary,' on the 18th September.

A Pampas cat (*Felis pajeros*) from La Plata, being a beautifully marked species quite new to the Society's collection.

Two black-billed sheath-bills (*Chionis minor*, Hartl.) from the Crozette Islands, presented by E. L. Layard, Esq., F.Z.S., on the 26th of October.

A fine specimen of the aard-wolf of the Cape of Good Hope (*Proteles Lalandii*), purchased by the Society, October 26th, of Capt. W. R. Dixon, of the Cape Mail Company's service, and believed to be the first example of this rare mammal ever brought to Europe alive.

The sum allowed in the estimates for the ordinary purchases for the Society's Menagerie in 1867 was £2000. The amount actually spent in this manner, together with carriage and keeper's travelling expenses, was £2099 9*s.* 10*d.* Besides this, however, special expenses connected with the increase of the Menagerie, amounting altogether to £632 8*s.* 11*d.*, were incurred under the following circumstances:—

The young male sea-lion (*Otaria jubata*) acquired by the Society in 1866, having proved to be an animal of no ordinary interest both to scientific observers and to the public, the Council, as already announced to the Society in their Report of the year 1867, made arrangements to obtain another individual of the same species to replace it. To this end they despatched to the Falkland Islands, in June, 1867, the keeper François Lecomte, with instructions to endea-

vour to bring home as complete a living collection as possible of the mammals and birds of those islands.

Lecomte left Swansea on the 1st of June, 1867, in the coal-ship 'Epsilon' (Captain Williams), and arrived at Port Stanley on the 11th of August. The first fortnight after his arrival he devoted to excursions along the shores in the vicinity of Port Stanley, but found little of interest here. In the middle of September Lecomte went to Capt. Packe's establishment at Island Harbour, and stayed there a month, searching the creeks and shores diligently in that vicinity. In December Lecomte returned to Port Stanley, where Governor Robinson most kindly gave him a room in Government House whilst engaged in preparing specimens and prosecuting researches for the Society. His Excellency likewise allowed him the use of a schooner of eight tons burden, in which he made several voyages to Volunteer Lagoon and the adjoining shores of East Falkland. This was in the month of December, when the various species of penguins, of which Lecomte made a considerable collection, are most easily captured.

About the beginning of March Lecomte left Port Stanley again in the Governor's schooner for "sea-lion Island," off the south shore of East Falkland, with the expectation here, at least, of meeting with the animal whence the island has received its name. But he was again disappointed, not a single sea-lion having been found in this locality. But on the southernmost of the Kelp Islands, lying further north, which were visited on the return voyage, a herd of about thirty individuals of this animal was discovered; an old male (of which the skull was preserved) was shot, and four young ones (two males and two females) were captured. The female sea-lion produces her young (rarely more than one at a birth) about Christmas-day, so that these animals were probably between three and four months old when captured. Lecomte returned at once to Port Stanley with his captives, but found much difficulty in rearing them. The supply of milk was limited, and small fishes, such as they could eat, were with difficulty to be had. The last of the four died upon Good Friday (April 10th), whereupon he immediately determined to set about getting a fresh supply.

The governor's schooner being now employed upon other service, Lecomte hired for this purpose the schooner 'Felis' (Capt. Hansen), a vessel of about twenty tons, usually engaged in the penguin and seal fishery, and left Port Stanley on May 23rd. At Kelp Island, the first spot visited, they could not land from bad weather, but sea-

lions were observed with the glass. On the 30th of May they were on Great Island in Adventure Bay, and here succeeded in capturing the only two sea-lions met with, both of which were young females. On the 8th of June two others (one male and one female) were taken at North Point Island, off the same coast, the female being that which is now in the Society's Gardens, and Lecomte immediately returned with all four of them to Port Stanley.

From Port Stanley Lecomte proceeded home by the packet 'Fawn,' which meets the mail-steamer at Monte Video, with the following living animals:—

Four sea-lions (*Otaria jubata*).

One Gentoo penguin (*Pygosceles Wagleri*).

Four rock-hopper penguins (*Eudyptes nigrivestis*).

Six kelp geese (*Chloëphaga magellanica* and *C. antarctica*).

Nine logger-headed geese (*Micropterus cinereus*).

Eight Johnny rooks (*Milvago australis*).

Seven cormorants (*Phalacrocorax magellanicus* and *P. carunculatus*).

Twelve gulls (*Larus dominicanus*, *L. Scoresbii*, &c.)

Six starlings (*Sturnella militaris*).

Twenty-two finches (*Phrygilus melanoderus*).

Two sea-hens (*Hæmatopus niger*).

Two foxes (*Canis antarcticus*).

But the weather was very unfavourable between Port Stanley and Monte Video, and seventy-one of the animals died *en route*. For some time longer the four sea-lions remained in good health and condition, but a passenger having died of yellow fever, the stock of fish shipped for feeding them was condemned on account of its smell, and ordered to be thrown overboard. The consequence was the loss of three out of the four sea-lions—the survivor having been kept alive as far as Lisbon, where a fresh supply was obtained, mainly by the flying-fishes (*Exoceti*), which fell on the deck at night and were purchased from the sailors who picked them up.

Besides the sea-lion, Lecomte succeeded in bringing to the Gardens only the following animals:—

One antarctic wolf (*Canis antarcticus*).

Two Forster's milvago (*Milvago leucurus*).

One kelp goose (*Chloëphaga antarctica*).

Two upland geese (*Chloëphaga magellanica*).

One Dominican gull (*Larus dominicanus*)

The cost incurred upon this expedition was considerable, having amounted in 1868 altogether to £507 8*s.* 11*d.*, besides £50 devoted to the same object in 1867, and it cannot be said that the value of the animals obtained equalled the expenditure. At the same time the expedition cannot be said to have turned out altogether a failure, since a specimen of the much-wished-for sea-lion was successfully brought home, and is still thriving in the Society's Menagerie. It is also right to state that the Council have every reason to be satisfied with Lecomte's conduct during this difficult and dangerous expedition, although the results obtained were not altogether so satisfactory as could have been wished.

A second item of special expenditure was likewise incurred by the Council last year in connexion with the Abyssinian Expedition. It appearing that the government had made no arrangement to attach to the exhibition any competent observer in the important branch of science to the promotion of which this Society is devoted, the Council were induced to address a memorial to the Secretary of State for India upon the subject. They were so far successful in their efforts as to induce the government to agree to pay the necessary expenses of a zoological collector, leaving the appointment in the hands of the Council. The Council had at first selected for this post an officer of the Indian Army, already well-known for his investigations into the Natural History of that country. This gentleman having been unfortunately incapacitated from joining the expedition by a serious attack of illness, the Council nominated in his place Mr. William Jesse, who had had considerable experience in zoological collecting in South America. Although much delay was caused by this change, Mr. Jesse managed to reach Abyssinia in February, 1868, and after the termination of the expedition made a journey into the Bogos country, whence he finally returned to England in August last.

Mr. Jesse's collections, as will be seen by his Report, which will be printed in the Society's 'Proceedings,' embrace about 1250 zoological specimens. The largest series obtained was that of the class of birds, in working out which the Society have obtained the services of Dr. O. Finsch, of Bremen, one of the best living authorities on African Ornithology. Dr. Finsch's completed memoir upon the birds collected by Mr. Jesse has lately been received, and will be read at one of the approaching Scientific meetings.

In anticipation of Mr. Jesse being likely to acquire some valuable living specimens for the Menagerie, the Council placed the sum of

£100 at his disposition for this purpose; but circumstances did not allow Mr. Jesse to make any material additions to the Society's collection.

These two items, added to the sum of £25 spent by Mr. R. Swinhoe upon the acquisition of Chinese animals under the circumstances mentioned in a previous Report, make up the previously mentioned total extraordinary expenditure of £632 8*s.* 11*d.* devoted to special acquisitions for the Society's Menagerie.

A list of animals which have been bred in the Gardens of the Zoological Society between the 1st of January, 1868, and the 1st of January, 1869:—

MAMMALS.

A Macaque monkey (*Macacus cynomolgus*).
A Rhesus monkey (*Macacus erythræus*).
Five common wolves (*Canis Lupus*).
Five North-African jackals (*Canis anthus*).
Two spotted hyænas (*Hyæna crocuta*).
Three Indian leopards (*Felis leopardus*).
An ocelot (*Felis pardalis*).
Two raccoons (*Procyon lotor*).
A ringed seal (*Phoca fœtida*).
A Cuming's octodon (*Octodon Cumingii*).
An Indian porcupine (*Hystrix leucura*).
Eight Fournier's capromys (*Capromys pilorides*).
A viscacha (*Lagostomus trichodactylus*).
A mouflon (*Ovis Musimon*).
An aoudad (*Ovis tragelaphus*).
A markhoor (*Capra megaceros*).
Three Cashmere-shawl goats (*Capra Hircus*).
Two hybrid goats (between *C. megaceros*, male, and *C. Œgagrus*, female).
Two elands (*Oreas Canna*).
A Nylghaie (*Portax picta*).
A hybrid gayal (between *Bos indicus*, male, and *Bos frontalis*, female.
A Persian deer (*Cervus Maral*).
A Formosan deer (*Cervus taivanus*).
Two Japanese deer (*Cervus Sika*).

A Sambur deer (*Cervus Aristotelis*).
A Mexican deer (*Cervus mexicanus*).
Two vulpine phalangers (*Phalangista vulpina*).
A short-headed phalanger (*Belideus breviceps*).
A red kangaroo (*Macropus rufus*).
A black-faced kangaroo (*Macropus melanops*).
A great kangaroo (*Macropus giganteus*).
Two yellow-footed rock kangaroo (*Petrogale xanthopus*).
A Bennett's wallaby (*Halmaturus Bennettii*).
Four Gray's Jerboa kangaroo (*Bettongia Grayi*).

BIRDS.

Two Talpacoti ground doves (*Chamæpelia talpacoti*).
A Maugé's dove (*Geopelia Maugæi*).
Five barred-shouldered ground doves (*Geopelia humeralis*).
Six bronze-winged pigeons (*Phaps chalcoptera*).
Two Nicobar pigeons (*Calœnas nicobarica*).
Eighteen Pallas's eared pheasants (*Crossoptilon auritum*).
Twenty-six Japanese pheasants (*Phasianus versicolor*).
Four Sœmmering's pheasants (*Phasianus Sœmmeringii*).
Twenty-two Reeves's pheasants (*Phasianus Reevesii*).
Fourteen cheer pheasants (*Phasianus Wallichii*).
Ten Swinhoe's pheasants (*Euplocamus Swinhoii*).
Five purple kaleege (*Euplocamus Horsfieldii*).
Six black-backed kaleege (*Euplocamus melanotus*).
Seven hybrid lineated Pheasants (between *Euplocamus Cuvieri*, male, and *E. lineatus*, female).
Eight Sonnerat's jungle fowls (*Gallus Sonneratii*).
A peacock pheasant (*Polyplectron chinquis*).
Twenty hybrid turkeys (between *Meleagris Gallopavo*, male, and *M. ocellata*, female).
Nine rufous tinamous (*Rynchotus rufescens*).
Three sun-bitterns (*Eurypyga helias*).
One hybrid ibis (between *Ibis alba* and *I. rubra*).
Four upland geese (*Cloephaga magellanica*).
An ashy-headed goose (*Cloephaga poliocephala*).
Five ruddy-headed geese (*Cloephaga rubidiceps*).
Five Egyptian geese (*Chenalopex ægyptiaca*).
Two black-necked swans (*Cygnus nigricollis*).
Seven ruddy sheldrake (*Tadorna rutila*).

Three mandarin ducks (*Aix galericulata*).
Five Bahama ducks (*Pœcilonetta bahamensis*).
A yellow-billed duck (*Anas xanthoryncha*).
Two glaucous gulls (*Larus glaucus*).

The Death of Species. By EDWARD NEWMAN.

(Continued from Zool. S. S. 1542.)

MIGRATION.

IN this age of unfixity and unrest, when nothing seems settled unless it be the desire to unsettle; when faith in the old is shaken to its foundation; when yearning for the new distracts our attention from the true; when we are required to renounce the most authentic records of facts, to abandon the most cherished conviction of years, and to accept crude hypotheses, which are neither clear to the minds of the propounders nor intelligible to the minds of the learners; when Science itself, following in the wake of so-called Theology, exhibits every symptom of confirmed insanity; it is refreshing to find a large class of facts still carrying their irresistible logic through all opposition. I mean the patent facts of migration. We all believe in them; we all admit their existence, although very few of us have any very precise idea of their cause, their effect, their variation, or their extent. It may be convenient to state *in limine* that there are two great phases of migration—the first, that of the swallow, which has an ascertained periodicity, and is double, having its ebb and flow as certain as the tide;

"Euns rediensque gaudet."

The second, which is single, is an EXODUS that meditates no return, and is exemplified by the locust, the sugar ant, the lemming, the Israelite and the Teuton. There is no reasonable doubt that both these phenomena tend to prolong the existence of a *species*, postponing indefinitely its ultimate death, but, paradoxical as it may appear, resulting in death to millions of individuals. The two phases are so mixed and involved that no classification of them could be otherwise than hypothetical, and will therefore not be attempted by me. I shall dwell for a while on that particular phase which serves especially to illustrate my views, and which I have denominated an "exodus."

There is an apparent recklessness in the commencement of an exodus, and an uncertainty of result in carrying it out, that have hitherto baffled all calculation. Certain beings appear where they were previously unknown, and often appear as it seems only to die: they devour our substance, and leave us their dead bodies. The effects are patent. The causes are hermetically sealed in a book we cannot open. Such phenomena have attracted the notice of mankind in all ages; but, search as we may, we find no explanation that tends to advance our knowledge or satisfy our longing for further information. The most profound thinkers have done little more than supply us with a *formula* of words by which to evade explanation. Thus Burke, writing of our own migrations,—the migrations of man,—informs us that "These movements of bodies of men are carried out by a sort of migrative instinct." Kingsley alludes to the phenomenon as the result of "restlessness, not nomadic but migratory, arising not from carelessness of land and home, but from a longing to find a home in a new land"; and, with regard to the Teuton in olden,—aye, even in pre-historic times,—he inquires whether "there is anything wonderful in the belief that the spirit of Woden, 'the mover,' may have moved them and forced them to go ahead as now." Latham, whose reflective power was quite as great as that of the illustrious authors I have mentioned, and whose acquaintance with philology and ethnology is infinitely greater, contents himself with the simple admission that "the southward migration of the Teutons between the days of Tacitus and those of Charlemagne, was of unparalleled magnitude and rapidity." The reader will scarcely fail to observe that these phrases amount to little more than an admission of inability to account for a phenomenon the existence of which admits of no question.

This "restlessness" is by no means confined to a species, order or class: we trace its existence in the world of Insects, Fishes, Reptiles, Birds, Quadrupeds and Men. A few years only have elapsed since I recorded in the 'Entomologist' the appearance of an aphis-destroying fly on our southern coast: this was Syrphus Pyrastri, an insect of great beauty and considerable size; examples were sent me in bottles, boxes, and envelopes, and were denominated "horse-stingers," wasps, bees, musquitoes and locusts, and the accounts of the manner of their appearance were equally diverse; the following facts, however, remained after the narratives had been sifted with the utmost care: the swarm came from the land, not from the sea: it was so numerous as to have the appearance of a thick mist for hours continuously: the

term "countless myriads" is far too vague to give any adequate idea of number: the individuals composing the mist fell in a slanting direction into the sea, and so died: the dead bodies were returned by the tide, and formed a belt on the sea-shore many miles in extent: the Isle of Wight, Hampshire and Dorsetshire were particularly mentioned as localities: the dead bodies might have been collected by cart-loads. I wish to invite particular attention to this case; because I know of no record of the species having been known to swarm or migrate either before or since; and also because the insect is a very conspicuous one, and could not have escaped notice had such been the case; and again because the several species mentioned in the subjoined extract from Kirby and Spence, come exactly under the same category; the extract is rather a long one, but it is so exactly to my purpose, and is accompanied by reflections so valuable, that I feel I need make no apology for quoting it entire. The authors describe the swarms of Aphides or plant-lice, which often annoy us by their multitudes, covering our clothes and getting into our eyes, noses, mouths and ears: but when we reflect on the marvellous natural history of the Aphis, which only acquires wings once in several generations, we cannot consider the fact of its using those wings when acquired for the purpose of transport to other localities as abnormal. In fact, I regard these migrations as an ascertained feature in the life-history of Aphides, and one that at present knows no exception. Kirby and Spence, after giving instances of such swarms, proceed thus:—

"As the locust-eating thrush accompanies the locusts, so the lady-birds seem to pursue the Aphides; for I know no other reason to assign for the vast number that are sometimes, especially in the autumn, to be met with on the sea-coast or the banks of large rivers. Many years ago, those of the Humber were so thickly strewed with the common lady-bird, that it was difficult to avoid treading on them. Some years afterward I noticed a mixture of species, collected in vast numbers on the sand-hills on the sea-shore, at the north-west extremity of Norfolk. My friend, the Rev. Peter Lathbury, made long since a similar observation at Orford, on the Suffolk coast; and about five or six years ago they covered the cliffs, as I have before remarked, of all the watering places on the Kentish and Sussex coasts, to the no small alarm of the superstitious, who thought them forerunners of some direful evil. These last probably emigrated with the Aphides from the hop-grounds. Whether the latter and their devourers cross

the sea has not been ascertained: that the Coccinellæ attempt it is evident from their alighting upon ships at sea, as I have witnessed myself. This appears clearly to have been the case with another emigrating insect, the sawfly of the turnip (Athalia Spinarum). It is the general opinion in Norfolk, Mr. Marshall informs us, that these insects come from over the sea. A farmer declared he saw them arrive in clouds so as to darken the air; the fishermen asserted that they had repeatedly seen flights of them pass over their heads when they were at a distance from land; and on the beach and cliffs they were in such quantities, that they might have been taken up by shovels full. Three miles inland they were described as resembling swarms of bees. This was in August, 1782. Unentomological observers, such as farmers and fishermen, might easily mistake one kind of insect for another; but supposing them correct, the swarms in question might perhaps have passed from Lincolnshire to Norfolk. Meinecken tells us, that he once saw in a village in Anhalt, on a clear day, about four in the afternoon, such a cloud of dragon-flies as almost concealed the sun, and not a little alarmed the villagers, under the idea that they were locusts; several instances are given by Rœsel of similar clouds of these insects having been seen in Silesia and other districts; and Mr. Woolnough, of Hollesley, in Suffolk, a most attentive observer of nature, once witnessed such an army of the smaller dragon-flies flying inland from the sea, as to cast a slight shadow over a field of four acres as they passed. Professor Walch states, that one night about eleven o'clock, sitting in his study, his attention was attracted by what seemed the pelting of hail against his window, which surprising him by its long continuance he opened the window, and found the noise was occasioned by a flight of the froth frog-hopper, which entered the room in such numbers as to cover the table. From this circumstance and this continuance of the pelting which lasted at least half an hour, an idea may be formed of the vast host of this insect passing over: it passed from east to west; and as his window faced the south, they only glanced against it obliquely. He afterwards witnessed, in August, a similar emigration of myriads of a kind of ground-beetle [*Amara*]. Another writer in the same work, H. Kapp, observed on a calm sunny day a prodigious flight of the noxious cabbage butterfly [*Pieris Brassicæ*], which passed from north-east to south-west, and lasted two hours. Kalm saw these last insects midway in the British Channel. Lindley, a writer in the 'Royal Military Chronicle,' tells us that in Brazil, in the beginning of

March, 1803, for many days successively there was an immense flight of white and yellow butterflies, probably of the same tribe as the cabbage butterfly. They were observed never to settle but proceeded in a direction from north-west to south-east. No buildings seemed to stop them from steadily pursuing their course; which being to the ocean, at only a small distance, they must consequently perish. It is remarked that at this time no other kind of butterfly was to be seen, though the country usually abounds in such a variety. Major Moor, while stationed at Bombay, as he was playing at chess one evening with a friend in Old Woman's Island, near that place, witnessed an immense flight of plant-bugs, which were going westward: they were so numerous as to cover every thing in the apartment in which he was sitting. When staying at Aldeburgh, on the eastern coast, I have, at certain times, seen innumerable insects upon the beach close to the waves, and apparently washed up by them; though wetted, they were quite alive. It is remarkable, that of the emigrating insects here enumerated, the majority — for instance the lady-birds, sawflies, dragonflies, ground-beetles, frog-hoppers, &c.—are not usually social insects, but seem to emigrate, like swallows, merely for the purpose of emigration. What incites them to this is one of those mysteries of nature which at present we cannot penetrate."—*Kirby and Spence*, vol. ii. p. 9.

Of the LOCUST, usually termed migratory, volumes might be written, and indeed have been written. The migratory locust, like other insects just enumerated, is not essentially a social insect: it is not influenced by those domestic propensities which induce bees, wasps, ants or Termites to associate; and yet how far beyond calculation are their numbers that congregate. The records, beginning fifteen centuries before the Christian era, and continuing up to the present time, are so accordant that one might serve for all. Omitting the plague of locusts which visited Egypt before the Exodus of the Israelites, and which stands on inspired authority, we shall find that profane history treats in the clearest and most unmistakable language of similar plagues in the years of our era, 591, 1478, 1650, 1748, 1778 to 1780 (in this instance extending over rather more than two years), 1784, 1797, 1799 and 1811. As a matter of course the earlier records are at longer intervals than the later ones; but it does not follow that the phenomena were less frequent. The records of 1811 are perhaps the most complete of all, and the pheno-

menon seems to have been universally associated with the comet which appeared in the same year, and with the conviction that the locusts fell from the clouds. The last-named solution of difficulties in physical science has been found perfectly satisfactory, and therefore comforting, in many other cases of difficulty, such for instance as nodules of iron pyrites, belemnites, magnetic iron, plant-lice, fishes, frogs, toads, quails, lemmings and very many other objects that pertinaciously decline obedience to human arrangements for their well-being: and when a sceptic hesitates for a moment to accept this solution, he is at once met by inquiry, "Well, where could they come from? I am certain there were no thunder-bolts (or frogs or toads as the case may be) in that field before."

I have said the accounts of locusts are accordant: they are mostly on this wise: the army is observed advancing like a cloud from the east; like a cloud also it disburthens itself of its load as it advances; a living load: the land is inundated with a devouring multitude; the locusts eat and pass onward, leaving no green thing on the face of the earth: onward they travel, stopping only to eat; onward, still onward, the main army passes on until it reaches the sea and perishes in its waters: even then there is no end of the apparent evil: the sea rejects their dead bodies which putrify on the shore, generating such fevers and plagues as have swept away hundreds of thousands of human beings. A few brief extracts may illustrate this: hundreds of similar ones might be made.

"The eggs [of the locusts] were no sooner hatched than each brood collected itself into a compact body of a furlong or more in square, and marching directly forward towards the sea they let nothing escape them; they kept their ranks like men of war; climbing over as they advanced, every tree or wall that was in their way; nay, they entered into our very houses and bed-chambers like so many thieves." —*Shaw.*

"Shortly after sunrise the whole body [of locusts] begins to move forwards in one direction, and with little deviation * * * they uniformly travel toward a certain region. In this manner they advance from morning till evening without halting, frequently at the rate of a hundred fathoms and upwards in the course of a day. Although they prefer marching along high roads, foot paths, or open tracts, yet when their progress is opposed by bushes, hedges or ditches, they penetrate through them."—*Pallas.*

"In the year 591 a swarm of locusts traversed Italy from east to west, and arriving on the sea-coast were drowned in such numbers that the stench arising from their putrefying carcases caused a pestilence that is calculated to have carried off a million of human beings and cattle."—*Mouffet.*

"In 1478 a migratory swarm visited Venetia, devouring every blade of grass and every green leaf, starving the cattle, and causing a famine of which thirty thousand human beings perished."—*Id.*

"In 1650 a swarm of locusts traversed Russia in three columns: they passed principally into Poland and Lithuania, where the air was darkened by their numbers; they moved directly onwards devouring corn both blade and ear, vines, pulse, willows and hemp: death at last overtook them, and then their dead bodies were heaped on one another to the depth of four feet."—*Bingley.*

"In 1748 a swarm [of locusts] entered Europe by Transylvania, flying just above the surface of the ground; they totally intercepted the sun's rays, and rendered it so intensely dark, that one person could not see another at a distance of twenty paces."—*Philosophical Transactions*, vol, xlvi., p. 30.

THE SUGAR-CANE ANT (*Formica saccharivora*).—Towards the end of the last century, but I am unable to give the year from some little confusion of dates, this apparently unknown, certainly unnoticed ant, appeared in the West Indian Island of Granada: it was said to have been imported, but from whence has not even been surmised (See 'Philosophical Transactions,' vol. xxx., p. 346.) From Kirby and Spence's Introduction of Entomology I make the following extract:—"The insect appeared in such infinite hosts as to put a stop to the cultivation of the sugar-cane, and a reward of £20,000 was offered to any one who should discover an effectual mode of destroying them. Their numbers were incredible. They descended the hills like torrents, and the plantations, as well as every path and road for miles, were filled with them. Many domestic quadrupeds perished in consequence of the plague. Rats, mice, and reptiles of every kind became an easy prey to them: and even the birds, which they attacked whenever they alighted on the ground in search of food, were so harassed as to be at length unable to resist them. Streams of water opposed only a temporary obstacle to their progress, the foremost rushing blindly on to certain death, and fresh armies instantly following, till a bank was formed of the carcases of those that were drowned sufficient to dam-up the waters, and allow the main body to

pass over in safety below. Even the all-devouring element of fire was tried in vain: when lighted to arrest their route, they rushed into the blaze in such myriads of millions as to extinguish it. Those that thus patriotically devoted themselves to certain death for the common good, were but as the pioneers or advanced guard of a countless army, which by their self-sacrifice was enabled to pass unimpeded and unhurt."

The migrative movements of reptiles and fishes appear generally connected with the duty of reproduction which all animals have to perform, and is therefore so far periodical; but there are deviations from this rule although not so decidedly marked, clearly ascertained or thoroughly authenticated, as to take rank with cognate phenomena in insects. Still there is vast importance in the migrations of fishes, bringing as they do food to our very doors, and drawing with them in the migrative current other creatures not impelled by the same instinct of procreation. The same may be said of the migration of frogs and toads, which have so excruciated the minds of thinkers, and have compelled the non-thinking masses to take repose in the cloud hypothesis and religiously to believe that, like meteoric iron, they fell in showers. Proceeding to birds I find abundant evidence of the phenomenon in question: I select three examples.

THE PASSENGER PIGEON.—This bird is called "Columba *migratoria*" from its extraordinary migrations, which seem to have achieved a world-wide notoriety. Wilson, the greatest biographer of the birds of the United States, attempts a kind of solution to this phenomenon, which he attributes to a want of food; but his theory does not appear satisfactory, inasmuch as it is unaccompanied by any statistics whatever, or any kind of evidence that the movement has its origin in the scarcity of food in any particular district; indeed, the very converse of this is the truth, for on some of these occasions the pigeons appear to leave a land which might be figuratively described as "flowing with milk and honey," and to take up their temporary residence where starvation and destruction stare them in the face. Then, again, if this were simply a raid in quest of food, it seems as though the movement must defeat its object by multiplying the consumers without increasing the supply. Be this as it may, it is certain there is no ascertained periodicity, or, so far as human sagacity can penetrate, no rationality in the migrations; they occur at no particular season, at no fixed intervals; they neither precede nor follow periods of scarcity or years

of plenty, and as yet no clew whatever has yet been found to their recurrence. With this introduction, I will give Wilson's narrative exactly as it stands.

"The most important feature in the natural history of these birds is their migration. These migrations are caused by the necessity of providing for food, and, consequently, they do not take place at any fixed period or season of the year; indeed, it happens sometimes that an abundant supply of food in one district will keep these birds absent from another for years. The multitudes of these birds almost pass belief. In the autumn of 1813 Audubon left his home at Henderson, on the banks of the Ohio, on his way to Louisville: having met the pigeons flying from N.E. to S.W. in greater numbers than usual, he felt an inclination to enumerate the flocks that would pass within the reach of the eye in the course of one hour. He dismounted, and seating himself on a small eminence, began to mark in his pocket-book a dot for every flock which passed: finding, however, that this was scarcely possible, and feeling unable to record the flocks as they constantly increased, he rose, and counting the dots he had already put down, found that 163 had been made in one minute. He travelled on, and still met more the farther he went. The air was literally filled with pigeons; the light of noon-day became dim, as during an eclipse. Whilst waiting for dinner at the 'Sun,' Audubon saw at his leisure immense legions still going by, and he says, 'But I cannot describe to you the extreme beauty of their aërial evolutions, when a hawk chanced to press upon the rear of a flock. At once like a torrent, and with a noise like thunder, they rushed into a compact mass, pressing upon each other towards the centre. In these almost solid masses they darted forward in undulating and angular lines, descended and swept close over the earth with inconceivable velocity, mounted perpendicularly, so as to resemble a vast column, and when high were seen wheeling and twisting within their continued lines, which then resembled the coils of a gigantic serpent.' Before sunset Audubon reached Louisville, distant from Hardensburgh fifty-five miles; the pigeons were still passing in undiminished numbers, and continued to do so for three days in succession.

"Audubon attempts to reckon the number of pigeons in one of these flocks, and the daily quantity of food consumed by it. He takes, as an example, a column of one mile in breadth, and supposes it passing over us without interruption for three hours, at the rate of one mile per minute: this will give us a parallelogram of 180 miles by 1,

averaging 180 square miles; and allowing two pigeons to the square yard, we have one billion one hundred and fifteen millions, one hundred and thirty-six thousand pigeons in one flock; and, as every pigeon consumes fully half-a-pint per day, the quantity required to feed such a flock must be eight millions seven hundred and twelve thousand bushels per day. Audubon thus describes the appearance of the pigeons at one of their roosting places: 'The sun was lost to our view, yet not a pigeon had arrived; but suddenly there burst forth a general cry of, *Here they come!* The noise they made, though yet distant, reminded me of a hard gale at sea passing through the rigging of a close-reefed vessel. As the birds arrived, and passed over me, I felt a current of air that surprised me: thousands were soon knocked down by the men provided with poles. The current of birds, however, kept still increasing; the fires were lighted, and a most magnificent, as well as a wonderful and terrifying, sight presented itself. The pigeons, coming in by thousands, alighted everywhere, one above another, until solid masses of them resembling hanging swarms of bees, as large as hogsheads, were formed on every tree in all directions. Here and there the perches gave way under the weight with a crash, and, falling to the ground, destroyed hundreds of the birds beneath, forcing down the dense groups with which every stick was loaded. It was a scene of uproar and confusion; I found it quite useless to speak, or even to shout, to those persons nearest me. The reports, even of the nearest guns, were seldom heard; and I knew only of the firing by seeing the shooter reloading. No person dared venture within the line of devastation: the hogs had been penned up in due time, the picking up of the dead and wounded being left for the next morning's employment. Still the pigeons were constantly coming; and it was past midnight before I perceived a decrease in the number of those that arrived: the uproar continued, however, the whole night; and, as I was anxious to know what distance the sound reached, I sent off a man accustomed to perambulate the forest, who, returning two hours afterwards, informed me he had heard it distinctly when three miles from the spot. Towards the approach of day, the noise rather subsided, but long ere objects were at all distingishable the pigeons began to move off in a direction quite different from that in which they had arrived the evening before; and at sunrise all that were able to fly had disappeared. The howlings of the wolves now reached our ears; and the foxes, lynxes, cougars, bears, racoons, opossums and polecats, were seen sneaking off from the spot, whilst eagles and

hawks, of different species, accompanied by a crowd of vultures, came to supplant them and enjoy their share of the spoil. It was then that the authors of all this devastation began their entry among the dead, the dying and the mangled. The pigeons were picked up and piled in heaps, until each had as many as he could possibly dispose of, when the hogs were let loose to feed on the remainder."—*Wilson's American Ornothology*, vol. iv., p. 319 of *Jameson's Edition*.

THE WAXWING.—In the 'Zoologist' for 1850 the details are given of five hundred and eighty-six of these birds killed in Great Britain in the winter of 1849-50, nearly all of them on our eastern coast: the direction of flight being westward is usual in their movements; but the time of year corresponds with neither the vernal nor autumnal migration: during the same winter Belgium, Holland and France were visited by immense flocks of the same species.

PALLAS' SAND GROUSE.—This bird is a native of Asia, more particularly of the Chinese Empire: as a British or even European bird it was unknown ten years ago. The following particulars are from the recently published edition of Montagu's 'Ornithological Dictionary.' The first record of the species visiting Britain was on the 9th of July, 1859, when a single specimen was killed at Tremadoc, in North Wales, and a second at Walpole St. Peter's, in Norfolk; and on the 23rd of the same month a third occurred at Hobro, in Jutland. An interval of three years elapsed before the bird was again observed, and then it made an invasion of Britain in force. Great pains have been taken in every part of the kingdom to transfer to the 'Zoologist' a record of every instance in which the bird was obtained or seen: their arrival on British soil seems to have commenced about the third week in May, and to have continued uninterrupted until the third week in June, when it ceased entirely: during this period about three hundred specimens were destroyed, and probably ten times that number observed. The birds seem to have arrived almost simultaneously at very distant and very opposite parts of the kingdom: we find them at Walney Island, off the west coast of Lancashire, on the 22nd of May, in Norfolk on the 23rd, at Aldershot, on the 26th, in Essex on the 27th, in Suffolk on the 28th, and again in Essex on the 29th: their flight was ever westward, but apparently without haste; they constantly alighted and ate the seeds of a number of our commonest plants. I have made out a list of thirty-one species which grew freely from the contents of the crops of specimens that were killed: all of these seeds are small, and the number requisite to fill the stomach of

even a single bird is very large; so that it appears whenever they alighted they made free with the produce of the land, and evinced no inordinate haste to move forward. This exodus, like the others, knew of no return; and we may conclude that all the individuals which escaped our naturalists and our gamekeepers, succeeded in realizing the Atlantic ocean and perished in its waves.—*Montagu's Ornithological Dictionary, by Newman*, p. 141.

I will cite but one instance of this phenomenon in Quadrupeds:—

THE LEMMING.—Mr. Wood has summed up in a few brief sentences, which introduce rather than exhaust the subject, our very imperfect knowledge of the movements of the Lemming. He says,—"At uncertain and distant intervals of time, many of the northern parts of Europe, such as Lapland, Norway and Sweden, are subjected to a strange invasion. Hundreds of little dark mouse-like animals sweep over the land, like clouds of locusts suddenly changed into quadrupeds, coming from some unknown home and going no one knows whither. These creatures are the lemmings, and their sudden appearances are so entirely mysterious that the Norwegians look upon them as having been rained from the clouds upon the earth. Driven onwards by some overpowering instinct these vast hordes travel in a straight line, permitting nothing but a smooth perpendicular wall or rock to turn them from their course. If they should happen to meet with any living being, they immediately attack it, knowing no fear, but only urged by indiscriminate rage. Any river or lake they swim without hesitation, and rather seem to enjoy the water than fear it. If a stack or a corn-rick should stand in their way, they settle the matter by eating their way through it, and will not be diverted from their course even by fire: the country over which they pass is utterly devastated by them, and it said that cattle will not touch the grass on which a lemming has trodden. These migratory hosts are accompanied by clouds of predacious birds, and by many predacious quadrupeds, who find a continual feast spread for them as long as the lemmings are on their pilgrimage. While they are crossing the rivers and lakes, the fish come in for their share of the banquet, and make great havoc among their columns. It is a very remarkable fact that the reindeer is often seen to chase the lemmings, and the Norwegians say that the deer is in the habit of eating them. This statement seems, however, to be rather of doubtful character. The termination of these extraordinary migrations is generally the sea, when the

survivors of the much reduced ranks finally perish. Mr. Lloyd mentions that just before his visit to Wermiland, the lemmings had overrun the whole country. The primary cause of these strange migrations is generally thought to be hunger. It is fortunate for the country that these razzias only occur at rare intervals, a space of ten to fifteen years generally elapsing between them, as if to fill up the places of those which were drowned or otherwise killed in the preceding migration." *Wood's Illustrated Natural History*, vol. i., p. 564.

The migrations of the rat (*Mus decumanus*) are still more wonderful: it came from the east, and having traversed Asia, Europe and America, seems like the Teuton to be seeking new worlds to conquer.

Of "Man and his Migrations" so much has been written, and so well, especially by my lamented relative Dr. Prichard and by Dr. Latham,—on whom the mantle of Prichard seems to have fallen, —that it would be almost an impertinence on my part to enter into farther details, and yet these phenomena are of such paramount interest that it would be inexcusable to pass them over in total silence. I will mention two instances only,—the Israelites and the Teutons,—because these papers already occupy too large a space in the monthly issues of this periodical, not because the subject can possibly be exhausted by any amount of illustration, or can possibly fail to interest those who have once given it a moment's consideration; for I hold with Akenside, as quoted by John Hunter, and again by Dr. Latham, that—

> "The spacious West,
> And all the teeming regions of the South,
> Hold not a quarry, to the curious flight
> Of knowledge half so tempting or so fair,
> As Man to Man."

The Exodus of nations is not the work of a day; forty years were occupied in the transit of the Israelites from Egypt into Palestine, and this was not accomplished without strenuous resistance. The battle with Amalek which lasted until the going down of the sun; the driving out the Amorite, the Canaanite, the Hittite, the Perizzite, the Hivite and the Jebusite; the entire history of the wars of Joshua, show how great and how difficult was the enterprise undertaken by Moses of leading the Israelites into the promised land. There is a curious similitude and an equally curious contrast between the Exodus of the Israelites and that of the Teutons; the historian, in the first

instance, was with the invaders in spirit as much as in body; in the latter case his presence and sympathies were with the invaded; the sympathies of the historian, in both instances, were with his people, and the sympathy of after ages has been with the historian: thus we all believe in the barbarism of the Amalekites and Hittites, and also in the barbarism of those eleven thousand knights in polished armour of chain-mail and crowned with burnished casques and flowing plumes, who, with a million of retainers, swept "a human deluge" over central Europe and devastated Italy. The similarity between the two invasions is to be found in this, that both the invaders when compared with the invaded were strangers to that luxury which steeps the soul of man in sin, and rots the immortal while it enfeebles the mortal ingredient of the compound man. The Exodus of the Israelites was from a land of bondage to a land of freedom; that of the Teuton from some region still unknown, to a land whose wealth and whose advantages had been for centuries on centuries a lure to attract the hardy, the adventurous, the ambitious, the covetous: both migrated towards a "promised land flowing with milk and honey." The Israelites threw themselves recklessly on the spears of the Amalekites, the Teutons on the swords of the Romans. I am well aware that Divine protection was constantly afforded to the former, and is supposed to have been denied to the latter; but here, as in so many other cases, the facts remain and cannot be disputed. The emperor Marcus Aurelius Claudius, in a report to the Roman Senate of the battle of Naissus, in which the Romans defeated a Gothic army three hundred thousand strong, declares that the slaughter was so prodigious that the rivers were filled with their shields, swords and lances, and the banks covered with these implements of war, and that the fields were hidden by the bones of horses and men. The followers of Attila, for years previous to the day when he stood on the once sacred soil of prostrate Rome, filled the rivers of Italy with his dead, and polluted the atmosphere with the stench of putrifying human flesh. The Allemanni, a name which some historians have derived from the words "All" "Men," from their immense numbers and various lineage, laid waste the north of Italy in the year 260, and reached Ravenna, but proceeded no farther: in the same year the Franks poured through France, crossed the Pyrenees, swept the whole of Spain, and, crossing at the straits of Gibraltar, carried their victorious arms into Africa, pursuing their course until there was nothing found to conquer or destroy.

Now it may be humbling, but it cannot be disputed, it cannot even be doubted, that these various and infinitely different beings—the ladybird, the ant, and the sawfly; the dragonfly and the froghopper; the pigeon and the waxwing; the sand grouse, the lemming, and the rat; Moses and Johshua, Attila and Odoacer, the enterprising Columbus and the peaceful Penn—have been mere helpless instruments in carrying out natural laws. It may seem too ridiculous to suggest such an association as this, but the similitude may be carried a great deal farther: the greatest discoverers, the greatest warriors, the greatest lawgivers, the greatest philosophers, are equally subject to the laws of birth, life and death, with the lady-bird, the plant-louse, or the lemming: there is an appointed groove in which all travel.

Strange as it may appear, this very restlessness may prove the salvation of species; this incomprehensible impulse, this blind obedience to seemingly destructive law, may become preservative. The Teuton, whose home is desolate or so obscure that we cannot find it, has found new worlds in which to reside and multiply. Great Britain, America, India, Australia and South Africa have become Teutonic: that which to our most imperfect vision appears a reckless rushing on destruction, has served to preserve a race while it destroys the units. The ants which form a bridge of their dead and drowning ones, that enables the living to cross waters they could not ford, act on a principle of sagacity,—aye, of Infinite Wisdom,—of which they could never have the most remote idea: the wisdom is not theirs.

EDWARD NEWMAN.

(To be continued.)

Curious Dentition in a Rabbit.—Having in my possession two rabbits of curious dentition, and supposing them of sufficient interest for insertion in the 'Zoologist,' I send them to you, accompanied with a photograph and outline drawings. No. 1 is a young rabbit shot in November in the neighbourhood of Torquay, and has three upper and the two lower incisors extraordinarily bent, and of the following uncommon lengths: the longest upper tooth is $\frac{5}{8}$ of an inch in length and has a groove running along the centre from root to tip; the two lower teeth are of equal length—above $\frac{1}{16}$ of an inch long; the lower jaw is contorted. The breadth of its lower teeth is equal, being $\frac{1}{8}$ of an inch at the base and tapering towards the point to half that breadth. No. 2, an adult rabbit, shot likewise near Torquay, was procured by me in the flesh (it seemed to have been shot at least four days before) on the 24th of December. Its two lower incisors are of regular formation, curve abruptly upwards,

the left tooth slightly more than the right one, and are no less than 1½ inch in length: their breadth is uniformly ⅛ of an inch. Their tips are rather worn, as if by digging; they are ⅜ of an inch apart from each other, measuring from tip to tip. The upper incisors have nothing peculiar: part of its left ear is wanting.—*A. de Hügel; Torquay, May* 17, 1869.

Ornithological Notes from Stirlingshire.—March 6. Jack snipes still present in the marsh; I shot four to-day. Bean geese busy on the grass meadows in the Carse-land, low lying ground near the coast and around Grangemouth.

March 7. To-day heard, on reliable authority, that last year a pair of hen harriers bred in Stirlingshire, in a part which I have long considered abandoned by these birds: the gamekeeper shot the female bird and put his foot on the nest of eggs.

March 18. Otter trapped on the river.

March 22. Large flocks of golden plover coming inland, preparatory to breaking up for the breeding season.

March 31. Large colony of blackheaded gulls used to breed (as I am informed by an old "risidenter" in the parish of Kippen) on Flanders Moss, about ten miles west of Stirling, about thirty years ago. All left about that time, owing to the reclaiming of the Moss by the farmers: about that time also the colony, now breeding on the islands of Loch Lomond, first appeared there.

April 8. A song thrush has built its nest on the garden-seat close to where a blackbird reared its young in safety last year, as already accorded in the Zoologist. This nest, however, is not between the seat and the wall as the blackbird's was, but simply as it were lying on the seat; to-day there were three eggs in the nest, and the old bird was sitting on them.

April 16. A second otter trapped at the same place—a male, 20 lbs. weight. The toe-nails were worn off to the "quick" on three of the feet, by his endeavours to escape from the trap; left fore-foot nails perfect, that foot being the one in the trap.

April 18. First swallow seen by me, though a person told me he had seen two on the 12th.

April 22. First sandpipers seen on the river: they are wonderfully regular in their time of arrival here. Three pairs of kingfishers are breeding on the river banks this year.

During the month of May I was absent from home: on returning on June 8th heard that a Canada goose had been shot out of a flock of four, at Carron-dams, the day before; it is now at my birdstuffer's in Edinburgh. Two pied rooks were killed at our rookery this year,—young birds from the same nest, and killed by the same shot: large white patch on the throat, and the feet and bills even were partly white.—*John A. Harvie Brown; July* 1, 1869.

Tengmalm's Owl: correction of an Error.—I have just noticed a mistake in the 'Dictionary of British Birds,' relative to the birds of this county. The editor, quoting Mr. Hogg's 'Natural History of Stockton-on-Tees,' says that Tengmalm's owl breeds, or has bred, in Castle Eden Dene; but it was of the Scops eared owl that Mr. H. made this statement, which was most certainly an error, for I believe the Scops has never once been taken in Durham, though a single specimen of the Tengmalm's owl occurred in 1848.—*J. H. Gurney, jun.*

Flycatcher and Wren building their Nests together.—I saw this morning a very curious state of things at Swaysland's, viz., the nest of a wren with a flycatcher's built

into and on the top of it. The wren had made its nest of shavings, leaves, &c., and, evidently before the nest was quite finished, a flycatcher commenced building at the top, not simply taking it for a foundation, but so interweaving the moss and hair as to present the appearance of one nest. When brought in from Preston, where it was found the night before, the flycatcher's contained four and the wren's three eggs; but from the appearance of the back of the nest, I believe the latter had more in it when taken down. The nests were built in an elm tree, at a knot in the stem, and were partially concealed by elm twigs.—*T. W. Wonfor; Brighton, July* 3, 1869.

Ring Ousel in Kensington Gardens.—Referring to the notice of the ring ousel shot at Muswell Hill, which appears in the 'Zoologist' for the present month, I may mention that on the 26th of November last I saw one of these birds in Kensington Gardens.—*T. Vaughan Roberts; St Mildred's Court, Poultry, June* 14, 1869.

Golden Oriole at Scilly.—Our friends the orioles have made their appearance at Scilly again this season: one is in beatiful plumage, as bright as a marigold; the other, probably the female, in duller plumage. This species appears to be now a regular spring visitor to the Islands, in more or less numbers; but hitherto they have disappeared when the season for breeding advances, although to all appearances the birds have paired, and have been seen to frequent close plantations as if preparing for nesting.—*Edward Hearle Rodd; Penzance, May* 3, 1869.

Nightingale in Yorkshire.—I have great pleasure in recording the occurrence of the nightingale this season in Yorkshire. On the 13th of May one commenced singing in a small wood called Bushy Cliff, situate about five miles south-east of Leeds: it haunted some thorn bushes near a brook, and began to sing each evening about half-past ten, and continued in song till four in the morning. I, along with several others, walked about in the adjacent meadows most of the nights of the 15th and 16th listening to its charming music,—charming and rare, indeed, to Yorkshire men: the plaintive notes and the so-called water-bubble parts of its song were especially distinctive. I was somewhat surprised at its tameness: on the third evening many boys and young men from villages round about assembled and created some uproar without disturbing it from its perch, and the game-watchers got within a few yards of it. This tameness and indifference when singing is alluded to by various authors, and serves to distinguish it from all other nocturnal songsters. The highest parts of its song were plainly audible at three different villages on the west side of the wood in which it was located: I heard its notes distinctly when I was above a mile distant. Early in the morning of the 17th, four days after its appearance, it was captured with limed twigs by two Leeds bird-fanciers: a few meal-worms were thrown down among the twigs, and in less than five minutes after the bait was laid the bird was secured; greatly, I may add, to the mortification of hundreds who had listened to its surpassing song from their chamber windows. A friend of mine, who is an ornithologist in a small way, was present when it was caught, and saw that it *was* a nightingale. Before this occurrence I was amongst those who were sceptical about the nightingale being a Yorkshire bird, but now I am won entirely over to the other side. If the bird had not been caught there was sufficient evidence in the power and quality of its song, and in the peculiarity of its habits, to establish its identity. Mr. Kidd, I may just observe here, says that the nightingale is the easiest of all birds to catch. I believe the nightingale is known amongst the rude birdcatchers as the "red bird." Having

seen doubts expressed in various naturalist journals by respectable ornithologists as to this bird's occurrence in Yorkshire, and having been hoaxed once or twice myself, I was induced to think that it was either entirely wanting or excessively rare. I believe my friend Mr. Ranson, of Linton-on-Ouse, has argued that it is not a Yorkshire bird: Colonel Newman has also disputed our claim to it (see Zool. for 1862, p. 7827). There need, however, be no doubt concerning its occurrence here in the centre of the county, as an irregular visitor. Our late illustrious neighbour, Mr. Waterton, has the following short but positive remark as a postscript in a letter to a friend, dated as recently as January, 1865: "Walton Hall is twelve miles south of Leeds, and the nightingale breeds here and sings here charmingly." This is good evidence, not only of its singing but of its breeding in this county. In an interesting ornithological letter to me, dated January, 1866, Mr. Horsfall, of Horsforth, says:—"The nightingale visits us, but only at intervals; I know of only four instances of its having done so in fifteen years." Mr. Hobkirk places the nightingale in his list of Huddersfield birds. ('Huddersfield; its History and Natural History,' p. 216). It also has a place in two manuscript lists of Yorkshire birds in my possession. Mr. Talbot, of Wakefiled, an experienced ornithologist, assures me that it appears regularly in the south of Yorkshire; indeed, with a little industry, evidence of its occurrence in this county might be accumulated sufficient to satisfy Pyrrho himself. It is thirty-two years since a nightingale was heard in song in this immediate neighbourhood.—*George Roberts; Lofthouse, Wakefield.*

Nest of the Redstart.—The nest of this bird (the most beautiful of our summer visitors) is generally placed in a hole; but this year I found one built on the branch of a trained pear-tree: the presence of the owners on and about the nest, its structure and the colour of the eggs, preclude any mistake. This is the first instance of a departure from the hole that has fallen under my notice: an old oologist, also, informs me that he never knew of such a situation being chosen.—*J. Ranson; York.*

Arrivals of Summer Migrants near York.—Spotted Flycatcher (called in North Yorkshire the "Wall-chat"), May 10. Redstart ("Jenny wrentail"), April 28. On this date the male and female were first seen by me, but, as they had chosen a nesting-place and began to build, it is probable they might have been about nearly a week. Arrival in 1865, April 27; 1866, April 14; 1867, April 25; 1868, April 28.—*Id.*

A Dartford Warbler's Nest with five Eggs.—As is well known the rule with the Dartford Warbler is to lay four eggs, and some affirm they are never found with five: be that as it may, a nest containing five eggs was taken by Swaysland and his wife on the Downs, on June 25th. Since April they have taken seventeen nests, one of which had three, one five, and all the rest four eggs, in obtaining which they have spent days in observing the habits of the birds. I saw in one box thirteen nests, twelve of which contained four eggs each, and the thirteenth five eggs; and although there was great dissimilarity in the markings and outline, when nest with nest were compared, the eggs in each nest were similar.—*T. W. Wonfor; Brighton.*

The Redpole building in Brighton.—A redpole built its nest in a garden about 100 yards from Montpelier Crescent, in a willow close to a public path: the nest, containing five eggs, was taken. Nine days after another nest, built by the same birds and containing five eggs, was taken in an elder growing close by the willow: in the latter case, the nest was chiefly made of cotton from the willow.—*Id.*

Blue Tit's Nest inside a Thrush's Nest.—Examined on the 23rd May a blue tit's nest, containing nine eggs, built inside a thrush's nest in the top of a small fir: the nest was cup-shaped, and the remainder of the thrush's nest was filled up with rubbish, a cavity probably having been left, in which the blue tit had built: she flew off the nest the instant I touched the tree. I am unaware if the thrush's nest was one of this year.—*John P. Thomasson; Moorfield, Bolton.*

Martins and Swallows.—It may be interesting to your readers to know that on the morning of Thursday, the 27th ult., I found dead, under my southern windows, seven house-martins, and another on the following day in an out-house. On Monday, the 24th, it was close and thundery, and there was abundance of insect life, especially about the Trent, where the martins and swallows were very actively employed. Tuesday was cooler and also thundery, and heavy storms passed over Rugely and Stafford. Wednesday the wind blew cold and strong from the north, and such martins as were on the wing had much ado to find food or to hold their way on the lee side of two large elms in my garden. Many of the poor birds, too, hovered round myself in remarkable proximity, and it would have been easy to knock them over with the hand. On looking up at the steep roof of my vicarage at mid-day, I observed that it was *speckled* with scores and scores of martins clustered thickly together. On the following morning eight of the birds lay dead on the gravel-walk, and those that remained on the roof above were huddled still more closely together close to the stack of chimneys. The next day (Friday) few were to be seen anywhere here; more are about now, but still few in comparison with the numbers to be seen in the earlier part of last month. Swallows and swifts are still abundant.—*W. H. Walsh; Abrewas Vicarage, South Staffordshire, May* 5, 1869.

Cuckoo in the City.—On the morning of June 11th, when walking down Camomile Street, Bishopsgate Street, about half-past seven o'clock, a bird flew round and settled for a few minutes on the top of a warehouse, which gave me a good opportunity to determine the bird to be a cuckoo. Judging from the size it was a female, but the colour of the plumage was browner than is usual at this time of year.—*A. H. Smee; June* 16, 1869.

Dotterel near Weston.—We have had a small flock of the dotterel (*C. morinellus*) in this neighbourhood. One was shot in the Steep Holm in the Bristol Channel about the first of this month, and others were seen on the coast near this town.—*Rev. M. A. Mathew; Weston-super Mare, May* 15, 1869.

Blacktailed Godwit at Hickling.—I have in the flesh a blacktailed godwit, which was shot at Hickling, in Norfolk, on the 1st of May, and for which I am indebted to Mr. Gunn.—*J. H. Gurney, jun.; Bank, Darlington, May* 3, 1869.

Night Herons in Cornwall.—A few days since a male and female night heron were shot near Hayle, on our north coast: they are both well-plumaged birds, with three occipital plumes; the female is a little duller in plumage than the male, but in other respects very similar in plumage. The ovary contained eggs, some about the size of a small bean. The male bird was observed on a piece of marshy ground, stalking about with a flock of geese; the female was observed on a tree, and apparently resting on her breast, as her legs were observed hanging down.—*Edward Hearle Rodd; Penzance, May* 12, 1869.

Night Heron in Devonshire.—My brother (Lieut. W. C. Mathew, 81st Regiment) was taking a walk the day before yesterday on the banks of the Taw, and when about

two miles above Barnstaple he noticed a strange bird sitting on the lower branch of an alder bush overhanging the river. On approaching nearer the bird flew off, and my brother at once knew it was something uncommon; and as it pitched again within a short distance, he went to a neighbouring cottage and borrowed a gun, with which he was lucky enough to bring it down: it proved to be a magnificent male specimen of the above species in full breeding plumage, and was beautifully shot. It is now in the hands of Mr. E. Ward, of 60, Wigmore Street, who I dare say will be happy to show it to any one wishing to see it.—*Gervase F. Mathew, R.N., F.L.S.; Barnstaple, May* 16, 1869.

Crane at Lynn.—On Friday, the 4th June, a specimen of the crane (*Grus cinerea*), which is a very rare bird in this country,—only a few instances being on record of its capture in Norfolk,—was shot on the South Pickenham estate by John Hubbard, gamekeeper to E. A. Applewhaite, Esq.

Crane at Tewkesbury.—On the 22nd of May I received, in the flesh, a young male crane, which had been shot on the 17th by Mr. Joseph Smith, at Fiddrington, near Tewkesbury.—*J. H. Gurney, jun.; Bank, Darlington.*

Crane at Wareham.—On May 18th, we received from Wareham an adult female of the common crane (*Grus cinerea*).—*William Hart; Christchurch.*

Cranes in Norfolk.—If your correspondent "Grus" (Burnham), who announced in last week's 'Field' the occurrence of four cranes at Burnham, Norfolk, would kindly forward me any further particulars respecting them to 10, Unthank's Road, Norwich, I should feel greatly obliged. I should be glad to know the age and sex, if ascertained, of the birds shot, and what has since become of them; also, if noticed, the contents of their stomachs. On the 7th of May two cranes were seen, and one, a young male, was shot in a barley layer at East Somerton, near Yarmouth. On the 25th of May another was shot and winged in the Saltmarshes at Thornham, near Lynn, and was kept in confinement till the 5th inst., when it died. Again, on the 4th inst., another young male was shot at South Pickenham, near Swaffham, which, with the Burnham ones, were probably members of one flock dispersed over that part of the country. The occurrence of so many of these rare visitants in one season is the more remarkable, as I am not aware of more than four examples having been killed in Norfolk during the last half century.—*H. Stevenson; Norwich, June* 15, 1869 (*Field*).

Little Gull.—A very pretty example of this species was picked up dead at Braunton last January, and has been preserved by the bird-stuffer of this town, who thought it was some species of tern.—*G. F. Mathew.*

Note on the Nest of Podiceps minor.—Never having seen the nest of the little grebe, I was very glad to avail myself of the opportunity of inspecting three, which offered itself on the occasion of a recent visit to Scoulton Mere. The first nest found contained no eggs, and had probably been robbed; the second contained two eggs, one fresh laid and quite unstained; the third, six eggs slightly incubated: all the nests were built just within the margin of the reeds which bordered one part of the island—not so far in as to be out of sight, and where the reeds grew sufficiently far apart to allow of the birds diving away from the nests without offering any impediment. They were composed, in each instance, of the dead leaves of the common reed (*Phragmites communis*), and at first sight presented the appearance of a small heap of wet and almost rotten vegetable matter, raised from four to six inches above the surface of the water. The two nests containing eggs were each covered over with the same material

as the birds had used in constructing them, the eggs being perfectly hidden under a layer of dead leaves, so arranged as to present the appearance of having been accidentally accumulated: the quantity was considerable, enough to cover the eggs to the depth of at least an inch. I regretted not being able to watch the birds in order to ascertain the mode in which this covering is placed on the nest; the time required by the birds to make the arrangement; and how it is disposed of when she is setting. No green materials were used in constructing these nests, as was the case in a very beautiful nest of the coot close by, in which the inside was composed of dead rushes (I think Typha latifolia), the outside having green leaves of the same plant plaited amongst them—the whole structure, beautifully neat and compact, presenting a complete contrast to the nest of the little grebe. On looking at these wet and dirty structures one cannot help wondering how the necessary heat is maintained to bring the eggs to maturity.—*Thomas Southwell; Norwich, May* 29, 1869.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

June 7, 1869.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Royal Society,' No. 111; presented by the Society. 'Proceedings of the Zoological Society,' 1868, Part 3; by the Society. 'Horæ Societatis Entomologicæ Rossicæ,' Vol. vi., No. 2; by the Society. 'Berliner Entomologische Zeitschrift, 1868, Parts 3, 4,—1869, Parts 1, 2; and 'Verzeichniss der Käfer Deutschlands,' von Dr. Kraatz; by the Entomological Society of Berlin. 'Illustrations of Diurnal Lepidoptera, Part IV., Lycænidæ'; by the Author, W. C. Hewitson, Esq. H. de Saussure, 'Reise der Oest. Fregatte Novara, Hymenoptera;' 'Etudes sur quelques Orthoptères du Musée de Genève;' 'Etudes sur l'Aile des Orthoptères;' 'Orthopterum Species novæ aliquot;' 'Phasmidarum novorum Species nonnullæ;' and Prof. Yersin, 'Note sur la dernière Mue des Orthoptères;' 'Note sur les Mues du Grillon champêtre;' 'Note sur le Xiphidium brunneum;' presented by Sir John Lubbock. 'The Zoologist,' for June; by the Editor. 'The Entomologist's Monthly Magazine,' for June; by the Editors.

The following addition by purchase was also announced:—'Récherches sur la Faune de Madagascar: Insectes,' par S. C. Snellen van Vollenhoven et Baron Edm. de Sélys Longchamps.

Exhibitions, &c.

Mr. Druce exhibited a collection of butterflies from Borneo, containing several novelties and rarities; amongst them a new Ornithoptera, a rare Charaxes, &c.

Mr. Stainton exhibited two specimens of a new species of Tineina, bred from larvæ sent by M. Millière, who found them at Cannes on Osiris alba. The bushy tufted palpi of the insect resembled those of Anarsia, and its habit was to sit with its head depressed as if resting on the palpi; the markings of the wings were like Zelleria or Swammerdamia. Mr. Stainton had seen the moth at Vienna and in other Continental collections, but the discovery of its habits and transformations was due to M. Millière, who proposed to describe it under the name of Paradoxus (n. g.) Osiridellus.

Mr. Stainton also exhibited drawings of the larva and pupa-case of Gelechia atrella, and was now able to corroborate the observation of Mr. Jeffrey (see Proc. Ent. Soc. 1866, p. xxv.) that this species is a Hypericum feeder. At the previous meeting of the Society, Mr. De Grey had given Mr. Stainton some Hypericum stems containing larvæ, which had since produced Gelechia atrella; when full fed, the larva cuts off the terminal portion of the stem, which appears to be slit up the side for the purpose of flattening it, and by spinning together the edges it forms a flexible case, within which it turns to the pupa.

Mr. F. Smith exhibited a bee which he had found on the previous day at Southend, in grass, so completely covered with larvæ of Meloe that it was impossible to determine the species of the bee until the greater part of the parasites had been removed; he did not remember to have ever found larvæ of Meloe so late in the season; there were forty or fifty of them on the bee when exhibited, when captured there must have been 300 or 400; the bee proved to be Melecta armata, itself a parasite in the nests of Anthophora.

Mr. F. Smith exhibited living specimens of Physonota gigantea, a remarkably beautiful species of Cassididæ, which however loses all its colour within two or three days after death, indeed some of them had faded and become dull during life; they were brought to Liverpool from Central America in a cargo of logwood, and were said to have dropped out of the cracks of the wood.

Mr. F. Smith exhibited a smooth corneous luminous larvæ from Uruguay, which he supposed to be a Pyrophorus. When placed in a dark room, the head appeared bright red, and each side showed ten bright green spots; the lateral spots were almost always visible (in the dark), the red only occasionally, and sometimes would remain invisible for ten minutes together; the colours were so intense that Mr. Smith compared them to the red and green signal-lamps of a railway train. It was said by the sender to be capable of living for two or three months without food, if placed in earth which was kept damp and occasionally changed.

Mr. Pascoe exhibited a beetle* brought by Mr. Du Boulay from West Australia, which possessed a very peculiar formation of the elytra with remarkable elevations on the hind part thereof, and which seemed intermediate between Hister and Claviger.

Prof. Westwood exhibited drawings of two new species of the Ectrephes of Pascoe (Proc. Ent. Soc. 1866, p. xvi. = Anapestus of King, in Trans. Ent. Soc. N.S.W. for the same year), which genus he now considered to be a strangely modified form of Ptinidæ; and of some other forms (Polyplocotes, n. g., &c.) which connected Ectrephes and Ptinus. Also, a new Articerus, a new Paussus, &c.

The Secretary read a letter from the Secretary of the Flax Improvement Association of Belfast, respecting the damage done by a small beetle to the flax crop, especially whilst the plant was in the seed-leaf. The species was determined by Mr. Janson to be the Thyamis parvula of Paykull.

Papers read.

The following papers were read:—

"Notes on Eastern Butterfles" (continuation, Eurytelidæ and Libytheidæ); by Mr. Alfred R. Wallace.

---

* The *Chlamydopsis striatella* of Westwood, Tr. Ent. Soc. 1869, p. 318.

"Observations on Lucanoid Coleoptera; with Remarks on some new Species, and on the present Nomenclature; accompanied by a Revised Catalogue of the Species," by Major Parry. (First Part).

"Remarks on the Genus Ectrephes, and Descriptions of new Exotic Coleoptera," by Prof. Westwood.

"Notes on Chalcididæ; and description of a new Species of Megastigmus," by Mr. Francis Walker.

"Descriptions of new Species of the Genus Pison; and a Synonymic List of those previously described," by Mr. Frederick Smith.

"Descriptions of new Genera and Species of Exotic Hymenoptera," by Mr. F. Smith.

New Part of 'Transactions.'

The second part of the 'Transactions' for 1869 (published in May) was on the table.

July 5, 1869.—FREDERICK SMITH, Esq., Vice-President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Transactions of the Linnean Society,' Vol. xxvi., Pt. 3; presented by the Society. 'Stettiner Entomologische Zeitung,' 1869, Nos. 1—6; by the Entom. Soc. of Stettin. 'Proceedings of the Royal Society,' No. 112; by the Society. Butler's 'Lepidoptera Exotica,' Pt. 1; by E. W. Janson, Esq. 'Descriptions of new Genera and Species of Tenebrionidæ from Australia and Tasmania,' by F. P. Pascoe; by the Author. 'The Zoologist,' for July; by the Editor. 'The Entomologist's Monthly Magazine,' for July; by the Editors.

The following additions by purchase were also announced:—Thomson, 'Skandinaviens Coleoptera,' Vol. ix. Gemminger and von Harold, 'Catalogus Coleopterorum,' Vol. iv.

Election of Member.

Albert Müller, Esq., of Eton Villa, Sunny Bank Road, South Norwood, was ballotted for and elected a Member.

Exhibitions, &c.

Mr. J. Jenner Weir exhibited a gigantic tick, nearly an inch in length, and half an inch in breadth: it was found on a Greek tortoise.

Mr. Colvile Barclay (who was present as a Visitor) gave an account of the damage done to the sugar cane in Mauritius by a species of Coccus, the "pou à poche blanche," or "pou blanc." See Proc. Ent. Soc. 1864, pp. 25, 51.

Mr. Frederick Smith exhibited drawings of the luminous larva shown at the previous Meeting (*ante*, p. xv.), and supposed to be a Pyrophorus. Dr. Candèze and Prof. Schiödte (who was present as a Visitor) were both of opinion that the larva belonged to the Elateridæ, and were equally of opinion that Mr. Andrew Murray's Astraptor illuminator (Journ. Linn. Soc. Zool., vol. x., p. 74, pl. i.) was not an Elater.

Mr. F. Smith exhibited a living male of the field cricket, Acheta campestris, found near Farnham; and remarked that though he required to be placed in the sun to make him begin his song, moisture seemed to give him an additional stimulus and made him sing the louder.

Mr. F. Smith also exhibited specimens, some of them alive, of Pissodes notatus, from Bournemouth, showing great variation in size.

Mr. Pryer exhibited a specimen of Eupithecia togata, taken in the previous month; the occurrence of the species in this country had not been recorded for some years. The locality was not stated. Mr. Dunning mentioned that he had taken the insect at Brandon, Suffolk, in 1849.

The Hon. T. De Grey exhibited three specimens of Cosmopteryx orichalcea, from Wicken Fen, Cambridgeshire; and six of what Prof. Zeller held to be a dark variety of Carpocapsa Juliana, though they were (part of a larger number) bred from beech in April.

Mr. Wakefield (who was present as a Visitor) stated the result of his entomological experience in New Zealand, apologising for the scantiness of his information on the ground that the whole of his collections had perished in the burning of the ship "Blue Jacket." As in mammals and birds, so in insects, there seemed a paucity both of species and specimens, and a poverty of appearance about the few that did occur. Mr. Fereday had not been able to get together more than fourteen or fifteen species of butterflies, and 250 of moths. Mr. Wakefield himself had obtained perhaps 120 species of Coleoptera, thirty or forty of Hymenoptera, and about 150 of Diptera. There was generally a close similarity to British species, but usually of an impoverished and inferior type. He had taken a clear-wing moth which he believed to be absolutely identical with Trochilium tipuliforme, but this species had probably been imported into New Zealand with currant bushes.

The Secretary read a letter from Mr. C. A. Wilson, Corresponding Member, dated "Adelaide, 21st April, 1869." The following are extracts:—

"MYRMELEONIDÆ.—We have had for some years past about seven known species of Myrmeleon and the same number of Ascalaphus, with few exceptions all found near Adelaide, though the greater part in each genus are very rare or scarce in individuals. These have long, doubtless, been named in English Museums, but we have not the names out here. All these insects are very fond of settling on the wire fences now used with post and rail all over the country for fencing; the size of the wire seeming to suit the grasp of their feet as well or better than a twig might do, and where they can rest undisturbed either by adjacent twigs or the motion of the object grasped. The species of Myrmeleonidæ lie with all their limbs flat along the wires, looking at a little distance merely like a gradual thickening and then decreasing of the metal, acting with their motionless habits and grayish colour quite as a passive means of defence by deception, one of the many ways in our insect world out here, in which they have "protective resemblances." Our common Ascalaphus while on the wing flies like the Myrmeleons, heavily or lazily, and soon settles, but places itself in a very different attitude,—it may be also a deceiving one: after the legs are arranged, its antennæ are stuck out straight before it, the knobs resting on or a little raised from the wire, but the abdomen is raised pointing upwards at an angle of 45°. All that I have seen in this position (as many as nine in a day) seem to have been females. The

morning is the best time to see them, as, if the wires afterwards become hot in the December sun, the Ascalaphi soon disappear; they are also quite motionless in this singular position, but apparently on the watch, as they can mostly, though not always be taken by a guarded motion of finger and thumb.

"MASON WASPS.—In the month of December I took my usual annual walk to a celebrated insect locality in the Mount Lofty range of hills N.E. of Adelaide, about six miles up a gully called Stewart's Gully . . . . . 'Whiz' came by a wasp with purple and yellow body [specimen enclosed; pronounced by Mr. Frederick Smith to be Paragia tricolor]. It hovered over the ground for a few minutes, and then went prone to earth and disappeared; on looking about I found a little chimney made of earth, down which the wasp had evidently gone: this structure was about half an inch in height and one-third of an inch in the diameter of its opening at the top, straight down the sides, and placed over a hole of the same size. With slight pressure, and without breaking it, I removed the chimney; and then its use became apparent, for, moved by the "gully breezes," little stones and bits of leaf came rolling down the incline, and several tumbled into the unprotected hole. I watched for a few minutes, but the tenant did not come out; and as I turned away, up flew another wasp of the same species, and at once went down another chimney but a few feet off, and which, from its similarity to the earth and stones around, I only discovered by this means. Presently a louder whizzing noise, and swiftly came two more wasps together: one of these seemed frightened and flew off for a time, but the other made great sweeps to and fro; I observed the object *aimed at*, and quickly removed the little structure before the builder in one of its curves came round again,—then, without hesitation, pausing, or being puzzled, it went directly down the uncovered hole, I must say much to my surpiise. I likewise took the chimney of a fifth wasp (which came soon afterwards), after it had gone below. These little buildings were all removed entire, but easily broke afterwards, having no hold on anything and the sides being very thin; meantime the first seen wasp had emerged from its cell, as it now returned and went below a second time. I did not observe that any of these (I concluded all to be females) carried any caterpillars or other food to their young (if any) in these subterranean dwellings,—perhaps the eggs were not laid or the young yet emerged: all these five domiciles were within a few feet of each other, and full six feet from the last was a sixth chimney, but the owner was not visible. These insects can, therefore, hardly be called gregarious, but had (as in the case of the holes made by the females of several of our Mutillidæ) merely placed their dwellings thus contiguous, the situation being most suitable, and perhaps from a little desire for companionship: these holes might also serve in future seasons for the young broods, and increase in numbers."

Papers read.

The following papers were read:—

"Notes on Eastern Butterflies" (continuation); by Mr. Alfred R. Wallace.

"On the Australian Species of Tetracha;" by Mr. Edwin Brown.

New Part of 'Transactions.'

Part 3 of the "Transactions for 1869," containing the conclusion of Dr. Sharp's Revision of the British Species of Homalota, published in June, was on the table.

Jottings on Snakes; with an Appendix, &c., on Snake Poison and its reputed Antidotes.

By CHARLES HORNE, Esq., B.C.S., F.Z.S.

THE following anecdotes of Snakes are now published inconsequence of the general interest taken in Natural History in all its branches, and especially in snakes. The fashion of the present day is to illustrate the habits and instincts of animals by stories relating to them, and I had at one time intended to prepare a volume or two, in humble imitation of Jesse, Buckland and others, but only relating to India. In the Mutiny of 1857 I lost the notes and collections of sixteen years, and those now set down in the exact words of the narrators are chiefly the collection of the following years.

The Appendix, consisting of extracts relating to snake poison and its reputed antidotes, will be found of great interest, and illustrates, in a remarkable degree, how little we really know either of the action of the venom, or of its antidotes.—*Charles Horne.*

These notes on serpents, which have been recorded by me during a long residence in India, may well be introduced by an account of the power of fascination possessed by the common English snake, and also by the stoat, given me in 1860 by the Rev. H. Bond, and which I will give in his own words.

"I have now no remembrance as to the year in which I noticed the following facts. Walking in an orchard near Tyneham House, in Dorsetshire, I came upon an old adder basking in the sun, with her young around her; she was lying in some grass which had been long cut, and had become smooth and bleached by exposure to the weather. Alarmed by my approach, I distinctly saw the young ones run down the parent's throat: at that time I had never heard of the controversy respecting this fact, otherwise I should have been more anxious to have killed the viper, to further prove the case: as it was, she escaped while I was more interested in the circumstance than in her destruction.

"On another occasion I was walking on the hill-side above West Creed Farm, in Purbeck: the down was scattered with low furze bushes, and my attention was arrested by a cry of distress; it proceeded from a rabbit which was cantering round in a ring, with a halting gait: I watched it for some minutes, but, as the circle became

smaller and the rabbit more agitated, I perceived a stoat turning its head with the rabbit's motion, and fixing its gaze upon it: I struck a blow at the stoat, but missed it; its attention was thus withdrawn, and the rabbit ran away with great vigour in a straight direction.

"On another occasion, walking up the hill above Tyneham towards the sea, I was struck by the shrill cry and fluttering agitation of a common hedgesparrow in a white-thorn bush. Regardless of my presence, its remarkable motions were continued, getting at every hop from bough to bough lower and lower down in the bush: drawing nearer, I saw a common snake coiled up, but having its head erect watching the bird. The moment the snake saw me it glided away, and the hedgesparrow flew off with its usual mode of flight."—*Henry Bond, Vicar of Petherton.*

I need make no apology for recording the foregoing, although I have been told that Mr. Frank Buckland has alluded to one of the stories in one of his popular works. The power of fascination is now, I believe, generally admitted, although I have not seen it previously recorded of the stoat; whilst the fact of the adder swallowing her young and then disgorging is still with reason doubted by many,—myself amongst the number; and, in spite of the clearness with which the tale is told, there is always a chance of optical delusion, and the more so when the act seen, or supposed to be seen, is held to be a matter of course. But now to proceed to our Indian snakes.

Dangers to the Poultry-yard in India, &c.—The following notes were recorded at Bareli, in the N. W. Provinces, in 1854:—

One morning my fowlman came to me bringing a very large *cobra di capella*, nearly four feet in length, which he had just killed in my fowl-house. I had a separate division for the laying hens, and under the door of this there would seem to have been a small crack, through which, when thin, hungry and empty, this snake had squeezed himself: having entered, he went to the nests and in some way killed three fine hens, and then swallowed four guinea-fowl's eggs one after another. He now tried to make off, but could not return by the way he had come, the hole being now too small for him, distended as he was by the eggs he had eaten. The fowlman hearing the disturbance next came in, and soon disposed of the snake by a well-aimed blow at his head with a stick. I cut open the reptile, and took out three of the eggs unbroken; I had them set again, but I believe that the fowlman broke them, the rearing of such fowls being held to be unlucky by the natives.

On another occasion, a snake in some way entered my rabbit-house and swallowed three young rabbits, about one-third grown, in succession: he was of about the same size as the last, and was prevented getting away for a similar reason. I cut him open, and found the rabbits in his stomach apparently uninjured, saving that all their bones were crushed soft: the white fur was not even soiled.

In a similar way a snake was stopped in my pigeon-house, it having swallowed a pigeon.

From the above instances it will be seen that snakes do great injury in a poultry-yard; but whether they generally strike the fowls with their fangs, or whether they simply frighten them to death, I cannot say. I have carefully examined at least a score of fowls so killed, and could never find a mark of a bite. The native idea is that they spit poison at their victims, but this is manifestly absurd.

On a fourth occasion, August 18th, 1864, at Banaràs, I took unbroken from the inside of a cobra a guinea-fowl's egg, which had passed downwards eighteen inches.

Now that I am on the subject of snakes the following narrative, which I believe to be correct, may be held to be interesting. During the rains (June 1861) two of my servants were very keenly in search of a *snake-stone*. This is, as is well known, held to be an unfailing antidote to snake-poison, and the popular idea is that it may be found inside the head of any large bull-frog which has been seen to swallow a bird! They saw a very large yellow frog seated at the side of a deep water run, and watched him; a number of common minas (*Acridotheres tristis*, Linn.) were hopping about near quite fearlessly when the frog sprang upon one of them, and caught it in his mouth. He had seized him by the head, and the tail, feet and ends of wings were sticking out. It appears that the frog had been on the bank, and the birds a little below, by the water's edge, and that the former had sprang on the latter from a distance of nearly a yard. They attempted to knock over the frog by throwing a stick at him, but he jumped into the water, which was breast-high, with mud at the bottom, and so escaped them, although they kept watch on him for two days as much as they could, being very anxious to secure the valuable stone.

Here follows an account given me by the late Dr. Cheke, of Banaràs, relative to the habit of the large Indian "ram" frog of catching birds, of which there is also an account in vol. iii., p. 285, of Maclelland's 'Calcutta Journal of Natural History,' whereby the account just given

on native testimony is amply confirmed. In the year 1855, in the rains, Dr. Cheke was standing in his verandah with the late Claude Russell, when he observed a great commotion amongst some ten or twelve minas at a little distance. The chattering of the birds and their excited movements drew the observers to the spot, when, to their surprise, all the others flying away, they saw one of the minas (*A. tristis*) detained by a large bull-frog, which had hold of him by the thigh. He struggled hard to escape, but could not: stooping down, Dr. Cheke took hold of the bird and lifted him up, and with him the bull-frog, which refused to let go its hold for a long time; and doubtless had he not been disturbed, or the bird released by his companions, he had made a meal off him.

I have heard of another instance, which I will give in the words of its narrator, T. P. Gudgen, Esq., of the 2nd Dragoon Guards. "In August, 1858, when quartered at Marian, near Lucknow, I saw a large rain or ram frog spring in amongst a number of sparrows that were picking up waifs and strays in the shape of loose grains of rice, &c., near my servant's huts and catch one of them, with which it immediately made off. Some of my servants (who had also witnessed this little incident of frog life) and I immediately gave chase, and in a few seconds one of my syces (grooms) cleverly captured the frog by throwing a horse-cloth over it. On opening the frog's mouth, I found that the sparrow had not wholly disappeared, and that the legs and tail were easily come-at-able; I instantly seized the former with my thumb and finger, and gently withdrew the sparrow from its unique position. On examining the sparrow I found that, with the exception of a slight wetting and ruffling of the feathers, it had suffered little inconvenience from its temporary sojourn in a frog's throat. I may add that, as soon as the sparrow's feathers got dry, it flew away quite briskly."—*T. G.*

But enough of frogs, to which digression I have been led in my search for snake-stones. The *virulence* of snake bites is at times very great, *e. g.*, on the evening of July 2nd, 1864, one of my finest goats was bitten in the tongue by a snake in the grass; she bleated three times very loudly so as to attract notice, but she was lying dead ere any one could reach her; she may, however, have been bitten a short time before we noticed her. Here is a case of cure worthy of record, and given in the words of the medical attendant, Dr. F. Pearson, of Almorah. "On May 30th, 1850, at about 3 P.M., Lieut. S. was bitten in the knuckle of the right thumb by a snake (which proved

afterwards to have been a cobra); immediately upon its occurrence,—at least, within five minutes of it,—he came into my room, and I at once (before he spoke) saw that something had happened, for his countenance wore an anxious and alarmed look. He told me that he had seen a large snake coiled up asleep within a few yards of the door, and had seized it by the neck, but unfortunately not sufficiently far forward, for the head had play enough to turn round and bite him. Lieut. S. said he felt positive that it was not a poisonous snake, and consequently refused all treatment, saying that it would be all right presently. He then left for the billiard-room, which was next door: I, feeling uneasy about him, followed a few minutes after. I found him with a cue in his hand; but he was looking pale, and drops of perspiration were standing out on his face and forehead. The thumb also had swollen, and he complained of pain running up the arm: I persuaded him to return with me to the house, immediately upon entering which, he vomited. As no local remedies would at that stage have been of any use,—indeed, I much question if they are of any use at *any* period, for the poison on injection from the fang is *immediately*, in my opinion, intermingled with the circulation,—the case had simply to be dealt with on the principle that the action of the heart must be restrained until the sedative influence of the poison had passed off. Within a short time after the vomiting, Lieut. S. began to feel sleepy; and the pulse, on examination, was found to be lower; it was, therefore, time to commence operations. A dose of sal volatile in whisky was administered, and Lieut. S. was directed to walk quietly up and down the verandah: the time was then about 4 P.M. The desire to sleep, notwithstanding the exercise, was so strong that I was before long obliged myself to walk with him to keep him up to the mark. Later I had to send for two soldiers to support him by each arm; for the limbs were beginning to drag, and the drowsiness was intense: the pulse was at the same time exceedingly low, and the pain and swelling of the arm had increased considerably. From time to time diffusable stimulants were administered, and the walk was quickened into a run whenever the falling state of the pulse demanded it, which was frequently the case, for at times it was scarcely to be felt. At about 1 A.M. the case attained its period of greatest intensity; for at that time it seemed as if neither running nor stimulant would maintain the circulation any longer, and I feared it would end fatally. Shortly afterwards, happily, the pulse began to improve, which improvement was maintained until about 3 A.M., by which time the

influence of the poison seemed to have nearly passed away, and I put my patient in his bed, when he at once fell into an uninterrupted sleep for many hours; but it was some weeks before he completely recovered from the bite, for there were a series of small abscesses up the arm, with much low inflammation to be encountered ere health was restored."

I met this officer in excellent health in 1868.

I knew a horse at Sultanpùr, near Banaràs, to be killed by a snake bite. In this case the snake came out from a hole in the wall near the horse's head. Like as monkeys are said to give notice of the whereabouts of tigers, so have I often seen small birds give notice of snakes. Near Banaràs I saw a number of birds busy about a snake, making a great chattering, and he had probably caught one of their number.

On another occasion I watched seven or eight sparrows attacking a small snake, which, although wounded, escaped.

I will now give a curious story in the words of its narrator, Mr. Weber, of the Training School at Segra, near Banaràs, which is quite authentic.

"On the 26th March, 1864, at 10 P.M., when about going to bed, I heard our two little dogs bark very furiously in the garden. The choukedàr (watchman), who was sent to find out what enraged them so much, reported that they were barking at some animal that was hissing like a 'neolà' (*Herpestes malaccensis*), which, however, on account of the darkness, he had not been able to see. On his return with a lanthorn he soon discovered the hissing creature so furiously barked at to be nothing less than a snake, on seeing which he cried, 'Ek bara sámp hai!' (Here's a big snake). Our students and servants no sooner heard this than they all came rushing to the spot, each provided with a 'lathi' (stick): though they could only now and then get a glimpse of the snake, they soon saw, by its raised and active head, what a dangerous adversary it was for the dogs, which were still trying to get hold of it. The people attempted to get the dogs away, so as to be able to get at the snake with their lathis; but both of them were so enraged that they would not by any means be got away: after five to eight minutes more fighting the snake suddenly disappeared, and nobody could tell where it had gone—even the dogs had lost sight of it; but whilst the men and one of the dogs were searching, the other dog, quite in a different direction, rushed suddenly into the garden-hedge, and when with the same quickness he

returned, we to our great astonishment saw him bringing the snake in his mouth: without stopping he took it some eight or ten steps towards our verandah, on which I was standing, and then, after having shaken it violently, dashed it on the bare ground, which done, he immediately withdrew backward, so as to give the bystanders an opportunity to make use of their sticks: whether these were still necessary or not I could not find out. In catching the snake in the hedge the dog was less than a minute; and then I heard him scream, as he always does out of sheer pleasure the moment he catches a neola or a rat. The snake proved to be a little more than three feet in length, and two inches behind its head the marks of the dog's teeth could plainly be seen. Three days after this had taken place the dog again encountered a cobra at the edge of our verandah, which was then killed by the servants whom his noise had attracted."

I have heard of one other dog who went about killing snakes, and he seized them in exactly the same manner behind the head. A story relating to this animal is hereinafter told.

I will now give, in the words of the narrator, the Rev. M. A. Sherring, LL.D., of the London Mission, Banaràs, an account of the curious manner in which a snake was captured. "My servant set the rat-trap (which was of ordinary size and shape) one evening, in a small room in the mission-house bungalow. The next morning, on looking in, he saw a large snake of the cobra species angry and savage, and, in addition, in one corner, a musk-rat quite dead: whether the animal died from terror, or from the bite of the reptile, does not appear. It is probable that the snake had pursued the rat into the trap, and that the door then falling had shut them both in. The snake was fully three cubits, or 4½ feet in length, and of proportionate thickness, and filled up a large portion of the trap; it was afterwards killed."

I have already shown how, in some cases, dogs kill snakes (although, in truth, they are oftener killed by them, as all sporting men in India too well know), and I now propose to show how some cats catch and kill snakes, and the use they make of them when caught: the story is given in the words of the narrator, Captain Campbell.

"At Fyzabad (Oudh), in 1863, several of us were assembled one morning in the verandah of the mess-house, when we perceived a snake stealing along just outside: we got a very fine Persian cat, belonging to Mr. Toke, who lived in the mess, and showed her the snake: to our surprise she at once flew at it, and, seizing it just at the back of the head, killed it at once. Not satisfied with this, she

evidently thought it a good opportunity of giving her kittens (of which she had three or four) a treat: we watched her taking it to the box in which they were kept, where she commenced tearing it into little bits, and then laid the dainty morsels before her offspring, and in a short time the whole, with the exception of the head, was consumed."

Snakes are often found in bath-rooms, and for a very good reason, viz., the presence of frogs, of which they are particularly fond. The following story illustrates both facts. As we were sitting at dinner, at Mainpurì, on the evening of November 12th, 1865, at about 8 P. M., we heard a strange sound which quite puzzled us. One suggested that it was a fox calling, another that it was some night bird; but one thing was quite clear, that, whatever it might be, it was close to the house. Our spaniel Fanny was lying under the table, so we called her. Fox! Fanny! fox!—upon which she sprang up and rushed outside with a bark; but having reached the spot whence the sound proceeded, she fell back and finally returned to the house. Meanwhile our servants had procured lights, and we found that a snake had seized a frog, who was making these piteous cries. The snake was between three and four feet long, and was said by the natives to be a karait, a most deadly species; and the frog he had caught, but not yet swallowed, was of an average size. The reptile was hanging about a foot and a half out of a drain-hole, and had caught the frog at the bottom of an empty drain-pan placed outside to catch the water. A few smart taps disposed of the snake and rescued the frog, which, however, shortly afterwards died of the poisoned bite he had received.

A curious case of misconception of their digestive powers happened at Banaràs, in 1864, when Captain Steward, of the Queen's Bays, sent me a straightened piece of iron hooping, twelve inches in length, he had taken from the stomach of a cobra, which had been killed near the mess-house: this iron hoop had tied round it at one end a quantity of linen rag, and had been used to wipe out the plates before washing them, and so was highly flavoured with soup, grease, &c. The snake was about two feet and a half in length: how he came not to find out his mistake as he was bolting the rough iron I cannot imagine.

The snakes—cobras in particular—much affect damp places on account of the abundance of food to be found in such localities, and here they meet with their principal enemies, viz., the large water birds and fish-hawks; *e. g.*, I find noted on the 23rd November, 1867, that as I was returning from Etawa to Mainpuri, I saw an adjutant (*Leptoptilos*

argala, Linn.), which had just caught a snake of about four feet in length: he was picking him up by the middle, and striking both ends against the hard ground with extreme rapidity, and he doubtless pouched him in a few seconds.

I have found the remains of snakes in the gigantic nests of Haliætus leucoryphus (*Pallas*), the ringtailed sea-eagle. A native of Rasèma, a village near Mainpuri, who was a great sportsman, described this bird as pouncing on the snake, pecking violently at its head, thus killing it, and then either deliberately eating it, or carrying it off to its young,—which last fact is confirmed by my previous observation. Another enemy is the serpent-eagle (*Circaetus Gallicus*), which is described in 'Jerdon's Birds.' He says, "My Meer shikaree (chief hunter) has seen them on the ground with their claws in the snake's head, its body coiled round the bird's wings, in which state the herd-boys sometimes kill them. The Yerklees say it has a figure of God's churk-ram under each wing, by which it prevents the snake going forward." I myself have not been fortunate enough to see it catching a snake.

And now a few words regarding the slough of the snake. This is often cast in curious places: a favourite resort near Azimghur, N.W.P., was a grove of trees which had been cut in, and so had thrown out many fine twigs from the stem: at about four or five feet from the ground, and amongst these rough twigs, which were very near to each other, I have constantly found the cast skins. Amongst rough grass and bushes is, however, the most common situation: sometimes they select closed venetian blinds. Here is a case. On the 10th October, 1867, as I got up in the morning, I saw something white in the venetians, which opened to the verandah: this I found to be the slough of a snake nearly four feet in length; I put it by, wondering what could have brought the snake to cast it in such a place. Next day a lady, an old resident, told me to be careful, as the snake would be sure to hang about, but I thought no more of it. On the 24th October I was sitting most of the day drawing in the reception-room, and *felt* a queer smell, but thought it might proceed from my subject, viz., a wasp's nest: I sat all day, the smell getting worse. Next day it was unbearable, and great search was made, and the annoyance was held to proceed from outside: the glazed door was opened, when looking up there was my snake caught in the door by the middle, quite dead of course, and where he had been hanging at least two days. These

doors are over nine feet high, and hence its not having been previously seen; and thus the snake hung too long as well as too high.

The sloughs, or snake-skins, are very much used by birds for nest building; I have seen portions of them in most hawks' nests, more especially in that of the ringtailed fish-eagle; whilst the mynas (*Acridotheres*) all use them extensively. The charming little nectarine (*Aractnechthra asiatica*, Linn.) uses little bits of them in his nest of spider's web; and four or five other species of small birds employ them largely. The villagers hold the ashes of the slough to be a charm, and an antidote for rheumatism, when rubbed up with oil; but I am not aware that any virtue really resides in them, although doubtless the friction and the oil may do good.

It is not often that natives of India take an interest in Natural History, and hence I know I shall be excused for introducing the following correspondence relative to the snakes (Cobras) feeding on fish and snails. Here it is, as it appeared in a letter addressed to the Editor of the 'Delhi Gazette,' with others to myself:—

Curious habit of the Cobra.—"I shall feel obliged by your kindly inserting the following, and also glad of any additional information on the subject which may be afforded by your readers. I have never heard it noticed before, that the black snake, or Cobra-di-capello, takes to the water and catches fish like a common water snake. Last year, when standing on the bank of the little stream at the bottom of my garden, during the rains, I saw on a rock at the other side two cobras, which appeared to be meditating crossing the river at a narrow place, where however the current was very strong, and they at last plunged boldly in, swimming fast towards the near side, whence they emerged, one having a small fish three or four inches long in his mouth, and quickly disappeared in the willow jungle, which covers both banks. About a month ago, when walking with Captain Battye and Lieut. Young, of this regiment, we saw a black snake, whose body, partly hidden amongst stones, was poised in an erect position, with its head only above water, evidently on the look-out for small fish and frogs: I shot it with a pea-rifle, and though both my friends were inclined to doubt the fact of its being a cobra, the matter was soon settled to our satisfaction by comparing it with a cobra fully six feet in length, which Lieut. Young's bull-dog had that very morning killed in my compound (the second killed by the same dog within a few days), when it agreed in every particular, not forgetting the *moveable fangs* so distinctive of this species. Again: yesterday evening, when fishing

for *sowl* or *murrell* fish, as they are called on the Bombay side, my bait, a fish about three inches long, was twice taken by black snakes having the same appearance ; but I did not succeed in landing either, as they were not fairly hooked."—*Lindsay F. Dickson, Assistant-Surgeon ; Meywar Bheel Corps, Kherwarrah Rajpootanah, 2nd January*, 1867.

This interesting letter called forth the following :—

" Sir,—I am happy to be able to record, for the information of Mr. L. F. Dickson, the following additional information respecting the curious instinctive habit of a cobra, to which I was an eye-witness. " When residing in Bengal, in the vicinity of Calcutta, I observed near a tank in an extensive paddy-field called Nello, now in the jurisdiction of the Howrah Zilla, a black snake catching hold of a snail with its mouth and striking it hard against another, thus anatomizing its victims completely and devouring the contents of the shells. The reptile is hence called in Bengal " Gaun bhanga kaota " (snail-breaking black snake). It is very venemous and is characterized for its great fury against man and beast, so much so that it would sometimes attack from a safe distance an innocent passer-by, even without any symptoms of aggression :* it generally moves about (in Bengal) at night in the hot season, and has sometimes a large diamond."—*Raj Chandra Sandel ; Benares*, 15*th January*, 1869.

I will now give one cutting from a paper, out of many, relative to cobra bites in Bengal : it is from the ' Bengallì,' a native paper published in English, under date April 13, 1867 :—

" A contemporary gives the following account of the case of a woman who had been bitten by a cobra. A grown-up woman, of the jula caste, passing by a drain or *khal* with a basket full of fishes upon her head, all of a sudden fell senseless on the ground, and strange to say immediately collapsed : instantaneous measures were adopted by the doctors (of whom there were more than one I believe), and other gentlemen present, to bring her to her senses, but to no effect, the disease not being at that time recognized. Just at this time the village chowkedar (watchman), who happened to pass by that way, examined her, jumped into the khal (drain), brought some leaves from

* Speaking of the Jaracára serpent, Mr. Bates says—" In conversing on the subject of Jaracáras as we walked onwards, every one of the party was ready to swear that this snake attacks man without provocation, leaping towards him from a considerable distance when he approaches."—' Amazons,' cap. xi., p. 379.

under the bushes that grew there, wrung their juice, and administered it down the throat of the woman; and when that was found to be impracticable (as the life was almost extinct) down the nostrils and cavities of the ears. This was continued for some moments, after which the woman appeared to move slightly, and then in a few minutes more perfectly recovered. She picked up the fishes that lay scattered about, felt abashed at the sight of so many gentlemen attending on her, and bowed away. After great importunities, the chowkedar told them it was the juice of the plant *golghosh* or *holkhosa* that he had used: it is a small plant, the flowers of which are used by the Bengalees in the worship of Saruswati, and found in cornfields."

So much for a newspaper story. After reading the letter of Raj Chandra Sandel I corresponded with him on the subject, and I subjoin his letters *in extenso*, and in the very words of the writer, who had evidently received a good English education in Calcutta: in reading them, it should be borne in mind that the writer is a Bengalee of good family.

"Sir,—I consider myself very fortunate in being introduced to you through the medium of a newspaper: by this event I expect much to learn from you, knowing you to be a gentleman of considerable information, and a lover of truth and science. I beg to say that I shall try to send you shortly the very limited doings of a very few animals that I have been able to notice, when I was residing in a pretty jungly village called Bellore, about four miles distant from Calcutta, on the opposite bank of the river Hoogly. I am sorry, however, I cannot give you the exact date of the occurrence: I think it was in 1856. But to tell you the truth, it is not an uncommon sight in the swampy villages around the metropolis, especially in those which are situate in the south of Calcutta. I wonder how this broad fact escaped your notice! The snails I allude to are freshwater ones, which are generally seen in hot weather sticking to the side of stairs of masonry ghats, or to small logs of wood thrown longitudinally on the banks of ponds, for the convenience of men in bathing and fetching water. I always saw them on the margin of tanks of sandy beds: they are black when alive, and are sold in the bazaars in villages. The lower order of people eat them: its broth, I am told, would cure insanity. The pundits in Bengal use these shells as snuff-boxes: they are also sold at Benares. I saw another kind of snail in Bengal, which are smaller, and which crawl on dry land: the colour of its shell, which is somewhat flat, is

rather white. The snail under notice is called here *ghoongha.** My statement as to a cobra having sometimes a diamond,—which is a popular notion,—will no doubt be ridiculed by many; I have here the authority of an ex-student of the Medical College of Calcutta, who on referrence remarked, that as this poisonous reptile lives a long life, the effect of time matures its carbon to a diamond. People say it sometimes emits light, which has perhaps led them to believe this: it is, however, a fact that a cobra would live as much as 100 years. I shall write again about it in my next; but, in the meanwhile, I beg to be allowed to say that there are several varieties of Cobra-di-capello, and the black snake is only one of them."—*Raj Chandra Sandel; Benares, January* 28, 1867.

" With reference to my letter of the 28th ult., and in reply to your favour of the 11th inst., I beg to write by this opportunity again:—

" The village in which I was residing in Bengal six years ago has, as I stated, a jungly aspect. The chief animals which I had the opportunity of seeing when living there, were snakes and frogs of different kinds, rats, bats, monkeys, jackals, otters, and several kinds of birds and numerous insects. The Cobra-di-capello has four varieties. The black snake, which is said to be the male reptile, is called *kaotá;* the other three, which are said to be females, are *khya, khoris,* and *gokhoors.* They are all equally poisonous; but each is characterised by a different feature. The black snake is, therefore, contrasted with the *khya,* which is white; whilst the others are holding intermediate positions. The great terror which the poisonous serpents have spread in Bengal has originated from time immemorial the *Munshá pujah,* or the worship of the Serpent Goddess, which is observed annually in the Bengali month of Bhadoe†, or when the rains are very excessive, and owing to which the cobra is obliged to take shelter, from the submerged state of the country around, in the burrows made in the dwelling-houses by the mice. The popular notion in Bengal is, that in every house there is a "tutelary" cobra, which has an attachment for the family, and which cannot be destroyed or expelled without the risk of a great calamity. This supposed serpent is called the "*bastoo*" serpent, *i. e.* belonging to the house.

" I once saw a man play with a black snake with a small stick, the sight of which crumpled the reptile, which was strutting with its fearful

* The common Indian term for a shell. † July—August.

hood. This stick was probably made from the branch of a tree called in Bengal "Isar mool:" it is a wonderful medicine for snake bite. Native bydas (physicians) are in the habit of extracting poison from the fangs of the cobra, which they use for medicinal purposes. There is a class of men in Bengal called *badas*, whose profession is to catch snakes: these men, who profess to be well versed in serpent-catching-incantations, can trace them in cavities in fields, which they excavate and make them captives. Peacocks, I am told, are great enemies of serpents. There is a snake in Bengal which is generally five or six feet long: it is very timid, but very cunning; it is not venomous, but very dangerous to milch cows. It contrives to bind with its long tail the hind legs of a cow, and applies itself to one of its teats, and sucks the milk like an infant. This teat is always rendered milkless afterwards: from it can no milk flow.

"There is a serpent, which is very small, beautiful and harmless, with which little boys play by catching it and throwing it against each other. One of these snakes I saw (in July, 1855) being devoured by a large yellow (golden) frog, which here (N. W. P.), as well as in Bengal, makes its appearance in the commencement of the rainy season, when they, in a group, get on the shore of a tank and make awful noises, to the great distress of the reposer at night.

"I not only observed the strange habit of a frog in devouring the reptile, but also saw it catching hold of a young one of a bird which is here called *desi myuá:* I don't remember the date. I was unable, however, to observe this circumstance closely, as the little playful boys, observing it, were throwing brickbats at it to emancipate the poor bird, before I happened to approach.

"There is another kind of frog in Bengal, which generally inhabits the trees: it is slender in form, and makes an extraordinary long leap. It generally came across my way at night, when I had been at my study before a light, when it was raining heavily.

"There is a peculiar kind of rat in Bengal which climbs up trees, and devours the fruits thereof: their leaps are long enough, and they eat up the kernel of a cocoa-nut hanging down from the palm; they make a hole at the uppermost part of the fruit and consume its contents, and they are very nimble.

"Jackals are very cunning: I saw them carry away puppies from the bitch's lap by a strange manœuvre, which is worthy of notice. It was at dusk, when a bitch lay with her little ones in the corner of a ruined hut: a jackal contrived, by making its appearance as if to tempt the

animal to pursue him, when from behind came his companions who were in wait secretly, and bolted away with the poor puppies thus left unguarded by their mother.

"Otters are very useful to fishermen in Bengal, who have them for catching fish in rivers as well as in ponds; but as the animals always came down to fish at dead of night in deep ponds, I had no chance of seeing them dive.

"At Burrah-nuggur, a village about six miles north of Calcutta, I saw in a summer month, on a large tree, numerous bats, which were swinging with their heads downwards, and repassing guava seeds from their mouths to the ground below. I was informed that these animals have mouths only, which serve the purposes of consuming as well as for repassing.*—*Raj Chandra Sandel; Benares, February* 25, 1867.

These letters show the Babù to be a keen observer, whilst they contain valuable matter: would that more natives would so observe, for it is very interesting to have notes of native ideas and belief *recorded by natives.* The subject is tempting; but I will not swell this paper to greater length. The native belief regarding the flying foxes is very curious, and I cannot conceive whence it is derived; for natives handle these animals, and even kill them for their fat, which they esteem medicinally.

The natives call the thick yellow snake found in the N.W. Provinces (Cylindrophis Johnii ?) the double-headed snake: it is perfectly harmless, and is often kept by gardeners and others in earthen vessels. At times a scar is made at the tail end, and two minute marks for eyes added, when it is at first difficult to say which is the head and which the tail, the eyes being very small. I extract the following regarding this snake from my note-book:—"To-day (Oct. 12, 1867), about noon, a snake commonly known by the above name came up the road quietly to my front door; I went out, and found him basking in the sun; he was very thick, cylindrical, and covered with fine yellow scales. Both ends were of about the same size and shape, and he was very sluggish in his movements. I was told he was quite harmless. Gaindooa, my gardener, said that he once kept one for my predecessor,

* "Mr. Blyth states that it ejects by the mouth the large seeds of any fruit that it has eaten."—Jerdon, 'Indian Birds,' vol. i., p. 345. May not this have led to the idea of Raj Chandra Sandel about the bats doing much the same—and may they not do so?—*C. H.*

Mr. Henderson, and that the reptile had swallowed seven rats in one day! From what I afterwards saw I can almost believe it. He added that after the Dewalì (the festival of Lights, about six days hence) his head would become his tail, or that rather his tail end would come into work as a mouth. He was put into a round earthen pot (gharrah), and live rats were at once ordered for him. On the first rat being put into the vessel, the mouth being incautiously left open, it jumped out, when my dog Fanny, who was watching the operation with great interest, rapidly accounted for it: another was brought and put in, and the mouth closed; a little rustle was heard, and when we reopened the gharrah we found that the snake had encircled the rat in a threefold coil, and completely crushed him. The reptile had then turned his head, and seizing the rat by the nose began to draw him in: his jaws, which at first had looked so small, gradually distended as the eyes, ears, fore-feet, and ultimately the whole rat, disappeared. Dr. Tyler, who was present, having frightened the snake, he disgorged the rat with the greatest apparent ease; but he took it down again, when he was returned with it into the earthen vessel. He next swallowed the other rat which Fanny had killed, having first similarly encircled it; and I firmly believe he could have swallowed three or four more. The eyes were extremely small, and in life, unless this snake possesses a wonderful power of fascination, it could never catch a live rat: the body, of course, swelled to fully twice its original size after the meal, and they are said to be able to go without food for months, although, when food is taken, it does not take long to digest. In this they resemble the boa family, as also they appear to do in many other respects. What astonished me more than anything else, was the ease with which the food was disgorged: this was, however, greatly facilitated by the abundant flow of saliva, with which the disgorged animal was so covered as to be quite slippery; whilst every bone in his body appeared to have been completely crushed in the fearful squeezing he had undergone ere being swallowed.

"I had intended making notes on this snake, but after lying in a dormant state digesting his food for five days he became active, and one night poked a hole through the cloth tied over the mouth of the vessel, and so escaped."

Relative to the power snakes have of disgorging their prey, I quote the following, under date September 11th, 1867, from my note-book:—

"Just now my man brought me in a young fully-grown myna, larger than a thrush, which he had seen disgorged by a large black snake, after it had been more than half swallowed, *i. e.*, till mid-wing commencing from the head, or about five inches. The snake was in a 'kujur,' or date palm-tree; and the horsekeepers seeing it began to throw brickbats at it: upon one hitting it, it threw up the bird, which bore evident traces of having gone down head foremost, and relative to the extent to which he had been pouched there could be no doubt. I was not hitherto aware that a snake could thus disgorge. The said snake then went into the crown of the tree, where there were some fifty or sixty weaver-birds' nests, and where the rascal will find fine feeding. I do not know of what species the snake may have been, but it was probably a '*daman*,' which often climbs trees, and is at home amongst the boughs."

The natives have generally a great antipathy to snakes, believing nearly every one of them to be venomous; yet the appearance of a cobra in a hut is in some parts held, as before noted, a happy augury. Some of the large snakes—one in particular, the "daman," before alluded to—of the N. W. Province, which I believe to be harmless, attain a great size (I have found them eight to eleven feet in length), and live chiefly in trees, feeding, I presume, on birds; and it is curious to see these large creatures going from one tree to another without descending.

But I will bring these desultory jottings on Indian snakes to an end with the story of my first introduction to them at Midnapùr, in Bengal, in 1844.

I had heard that one might take up the worst snake, if you suddenly seized the tip of its tail with your left hand, and, passing the right hand up smartly round the body, arrest it just behind the head, there holding it firmly. It was in 1844, when I was living at Midnapùr, that a snake-charmer came with several cobras, which he set dancing. I remarked, "Of course all the fangs and poison-glands are removed." He said they were not. There were some sixty or seventy people present, when I went up, snapped up the largest snake by the tail with my left hand, passed my right hand up some four feet, and held him tightly just behind the head. I then let go of the tail, when the reptile twisted itself round my arm and body. I next took out my penknife from my waistcoat-pocket with my left hand, and, opening it with my teeth, proceeded to show how the fangs were gone, when, to my horror, I found fangs, poison-glands, and all complete!! A

kind of cold shudder went through me, as, with the utmost *sang-froid* I could muster, I called for scissors, wherewith I cut off the fangs by the roots ere I released the snake. It is the first and last snake I ever so took up; and I look upon the section of one of the fangs (which I now possess, set up as a microscopical object) with a feeling of thankfulness. The snake-charmer fell at my feet, and acknowledged me his equal, and as knowing all things and possessed of all power. I ordered of him three or four fine cobras, meaning to keep them, and prepared a box for them: they came, and that very evening all our servants gave notice to quit. In the night the snakes mysteriously deceased in their box; no inquiries were made; no servants left;—but I have never since attempted to keep venomous reptiles.

C. HORNE.

London, April 14th, 1869.

Collected Observations on British Reptiles.

By EDWARD NEWMAN.

(Continued from Zool. S. S. 1719).

THE TOAD (*Bufo vulgaris*).

Rana Bufo, *Linneus*, *Systema Naturæ*, vol. i., p 252.

Bufo vulgaris, *Dumeril* and *Bibron*, vol. viii., p. 671. *Bell*, *History of British Reptiles*, p. 115; *Clermont*, *Quadrupeds and Reptiles of Europe*, p. 252.

The toad has no teeth either on the maxillary bone or the palate: the tongue is rounded at the tip, without any indication of a notch; the nose is blunt and rounded; the entire surface of the body is covered with a dry skin, very harsh and unpleasant to touch—a character it derives from the presence of numerous warts, which are large and placed irregularly on the back, smaller and more regular on the belly. The eyes of the toad are prominent and remarkably bright; they look like small gold rings, each with a black centre or pupil; each eye is susceptible of being turned separately but very slightly, at the will of the animal, in any direction required—a feat that the chameleon performs to admiration, and one that has been supposed peculiar to that extraordinary animal. The exceeding brilliancy of the toad's eye no doubt induced the most appropriate speculation that the lark and toad had exchanged eyes; and also another very

favourite idea, to which the same unapproachable poet gave expression in the passage—

> "Sweet are the uses of adversity
> Which, like the toad, ugly and venomous,
> Wears yet a precious jewel in its head."

Pennant, in his Zoology, says—"The toad was believed to have a stone in its head, fraught with great virtues, medical and magical. It was distinguished by the name of the reptile, and called the toad-stone, Bufonites, Crapaudine, Krottenstein, &c.; but all its fancied powers vanished on the discovery of its being nothing but the fossil-tooth of the sea-wolf, or some other flat-toothed fish not infrequent in our island, as well as in several other countries." The editor of 'Popular Antiquities,' pursuing the subject farther, has added two interesting notes from the same author: he says, "These and other grinding teeth (alluding to the teeth of the sea-wolf) are often found fossil, and in that state called Bufonites or toad-stones: they were formerly esteemed for their imaginary virtues, and were set in gold and worn as rings."—(*Zoology*, vol. ii., p. 154). Thus the true toad-stone turns out to be something else, a something which retains none of its properties now that its supposed virtues have evaporated with the discovery; but the brilliant eye which gave rise to the idea remains as beautiful as ever. It is rather curious to find an author maintaining, with somewhat comic gravity, that "the people of England made superstitious uses of a real jewel that always could be found in a toad's head." Behind each eye is a large swelling or protuberance. The fore legs are short, and the toes, which are four in number, are turned inwards: they are slightly connected by a membrane at the base. The hind legs are considerably longer than the fore legs, and have five toes, all of which are connected by a membrane at the base; the fourth toe is much the longest, the third next in length, then the fifth, then the second, and the first is the shortest. Lord Clermont speaks of the rudiment of a sixth toe on the hind foot; but, having thoroughly examined the small wart-like process to which his lordship alludes, I find myself quite unable to take this view of its homology. I must also, although with considerable hesitation, dissent from Mr. Bell's *generic character*, "hind feet of moderate length, toes not webbed;" since in every instance that has come under my notice, the hind toes are most evidently webbed, although not to the extremities of the toes. The colour of the toad is dull brown on the back, the

tubercles having a slight tinge of brick-red; the belly and under parts of the thighs are dingy white, generally spotted irregularly and sparingly with black.

Toads vary considerably in size, and generally in accordance with age and sex; the oldest specimens are the largest, and females are almost invariably larger than males of the same age: the average length of a full-grown toad is 3¼ inches, but some specimens greatly exceed this size, and there are varieties or races inhabiting Guernsey and the Morea that are vastly superior to our English toads in magnitude: I have possessed for three years a living Guernsey toad as large as a moderate sized tea-saucer.

The food of toads seems to consist of all living animals that are susceptible of being swallowed, but I have never seen a toad eat any vegetable matter or any dead animal. Insects are the favourite food; worms are occasionally eaten, and slugs more rarely: the oblong pellets of excrement we so often find on our gravel-paths are deposited by toads, and these prove that the principal food has been the night-wandering beetles,—the elytra, thoracic case, and other hard parts of which have passed undigested.

Mr. Bell, in his invaluable work on British Reptiles, gives the following account of the toad's manner of feeding. "The toad, when about to feed, remains motionless with its eyes turned directly forwards upon the object, and the head a little inclined towards it; and in this attitude it remains until the insect moves; when by a stroke like lightning the tongue is thrown forward upon the victim, which is instantly drawn into the mouth. So rapid is this movement that it requires some little practice, as well as close observation, to distinguish the different motions of the tongue. This organ is constructed as in the frog, and the surface being imbued with a viscid mucous secretion, the insect is secured by its adhesive quality. When the prey is taken it is slightly pressed by the margins of the jaw; but as this seldom kills it, unless it be a soft tender larva, it is generally swallowed alive; and I have often seen the muscles of the toad's sides twitch in a very curious manner, from the tickling movements of a hard coleopterous insect in the stomach. It will also take earth-worms of a considerable size, and it is a very curious sight to watch the manner in which the powerful and writhing worm is secured. If the toad happen to take it by the middle, the extremities of the worm are twined with great force and activity around the muzzle in every direction, in its attempts to escape; but the toad pushes one portion after another into its

mouth by means of the fore feet, until it all disappears, when it is swallowed whole."—*Reptiles*, p. 118.

I think in quoting this graphic passage with entire confidence, as emanating from so high an authority, I am bound to add that I have never been able to verify the description of the toad's tongue. I have never found any indication of the presence of the "viscid mucous secretion" of which Mr. Bell speaks, and the object of the rapid movement which Mr. Bell describes seems very similar to that of a dog snapping at a fly. The case is somewhat different with a worm, but under any circumstances there is a spasmodic or convulsive twitching of the toes during the act of feeding that is very peculiar, and which has rarely been noticed by toad-biographers.

No entomologist can possibly have passed over unnoticed the array of toads that collect round the foot of an often-sugared tree-trunk: there they sit waiting with the most exemplary patience for the Noctuæ, intoxicated with the judiciously prepared mixture, to drop helplessly to the ground, when their fate is sealed as effectually as in the pill-box of the collector. The moth is seized at once, and being occasionally too large to swallow with perfect facility and rapidity, is stuffed into the mouth with the hands. But perhaps the apiarian has a greater right than the entomologist to complain of the voracity of the toad, for it is well known to devour the honey bee when it has the chance. A friend of mine tells me that a stock of bees was observed to grow weaker day by day, until at last it became so pauperized that the hive was removed, and the bees turned out to shift for themselves: nothing amiss was detected in the interior of the hive. A second stock shortly afterwards exhibited similar symptoms of depopulation: a suspicion was now entertained that some nocturnal depredator entered the hive at night and devoured the bees. About two hours after dark the hive was visited, with a view to an inspection of the interior; but on arriving at the spot with a lanthorn, the owner found nothing but a large toad squatted on the alighting board, and looking about him with bright and animated eyes. Presently a night-roving bee returned home; there was a sudden movement on the part of the toad, and the bee vanished. A long interval of patient watching ensued, when a second bee came home, a similar movement of the toad followed, and the bee again vanished; but the light of the lanthorn being this time thrown full on the toad, he was distinctly observed to swallow. The toad was caught and killed, and eight still living bees were taken from his stomach. I attempt no explanation of

the mode in which the toad attained his station at the entrance of the hive, or what antidote he possessed to the poison so likely to be conveyed by the stings of the bees; all I can do is to vouch for the veracity of my informant, which I do without the slightest hesitation; and it is not a little singular that this taste for bees on the part of toads should have been noticed two hundred years ago in a quaint work intituled 'Profit and Pleasure united, or the Husbandman's Magazine.' In this strange but most interesting publication, all the enemies of the hive bee are enumerated, and the toad is placed at the head of the list.

A question has been raised as to the possibility of the toads attaining so elevated a position at the alighting board of a bee-hive, but those who have studied the habits of the toad well know that this is very practicable. Mr. Weir has stated in the 'Zoologist' that he once observed a toad perched sedately on the top of an open parlour door, and he seemed to be viewing the human transactions going on beneath him with as much interest as Cowper's philosophic Jackdaw; and I have often observed in greenhouses a toad squatting on the highest possible point, looking to admiration the boast of Alexander Selkirk:—

"I am monarch of all I survey."

Insects are, however, amply avenged on the toad for the incessant warfare he wages against them; and they inflict on him the most horrible of all deaths, that of being eaten by worms like King Herod of old. Every now and then you may meet with the distended and dried skin of a toad, concealing and containing absolutely nothing but bones and the few viscera that are absolutely necessary to maintain existence in its most enfeebled condition. The flesh has been slowly eaten away by the maggots of the Musca vomitoria, or some allied dipteron: many species of Musca and Anthomyia assist in this horrible task.

There is no link in the chain of evidence on this subject missing; we have the most unquestionable accounts of the fly intruding on the privacy of the toad in his retreat. "It is singular," says a writer in Loudon's 'Magazine of Natural History,' "that the blue-bottle fly should persecute the toad in his retreat from the mid-day sun, apparently mistaking the ill-favoured creature for some filthy substance which would serve as a pabulum for its young;" the writer evidently hinting at a fact in natural history which he was quite un-

prepared to believe. Next we have the following note by Mr. Charnock in the 'Zoologist' for 1845, at p. 1138.

"I observed a toad, about a week ago, in the evening after a shower of rain, crawling across a public road, which apparently had a white mark or patch across its back. On examining it closely, I found this occasioned by a large quantity of the eggs of one of the flesh flies being deposited on its back. Is this one of the means employed to keep these reptiles in check? I have never heard of it before: the toad seemed quite lively and in no way injured."

And again, at page 1215 in the volume for 1846, we have the following details from the pen of an excellent observer, Mr. Chennell, of Guildford:—

"Last summer, 1845, having noticed a great quantity of dead toads, I was induced to inquire the cause of their death. On the 23rd of August I selected one that seemed unusually inactive: all that I could then see of the disease, after a careful examination, was that one nostril was a little enlarged. I placed the toad in a box inaccessible to small insects, and on opening the box three days afterwards I found the frontal sinuses and fleshy parts of the head devoured by larvæ of the flesh fly: after eating the whole of the toad, excepting the skin and bones, they changed into the chrysalis state. I did not count the larvæ, but I should say they numbered a hundred."

Little as we find published on this subject, there is no fact in natural history more clearly established than this of the Diptera ovipositing on the bodies of various species of toads and frogs, with a view to making the softer parts of the body form a pabulum for the future larvæ. One of these has been so thoroughly studied in Australia, and is in itself so interesting, that I think it unnecessary to make any apology for transferring to the 'Zoologist' an extract from Mr. Krefft's paper, published in the 'Transactions of the Entomological Society of New South Wales.'

"In the course of my inquiries," says Mr. Krefft, "into the batrachian fauna of Australia, I have frequently captured frogs infested with a number of parasites seeming to be the larvæ of dipterous insects; they are generally found between the skin and flesh, just behind the tympanum, but in cases where three or four exist upon a single individual they reach as far back as the anus: these larvæ may be taken for glands at first sight, but closer examination soon reveals a small opening, and a gentle pressure will quickly exhume the yellow parasite. In all cases where the larva was forcibly ejected,

the death of the frog, whether large or small, was caused thereby, and in fact these creatures generally die after the larvæ have worked their way out. * * * It appears some frogs are more infested with this parasite than others: it is most common upon Cystignathus sydneyensis in this neighbourhood,—a remarkable fact, as this species is the smallest of the tribe and frequents the water much. At Shoalhaven I found Pseudophrine Bibronii much infested, some specimens not more than half an inch long in the body, having two to four larvæ to support; and whenever I found Hyla citropus I have *always* observed the larvæ of a fly upon them. I believe that the insect living upon Hyla citropus will prove to be different from the present species, as its larva varies in structure considerably from all others."—*Trans. Ent. Soc. New South Wales*, vol. i., p. 100.

These frog parasites appear to be œstridious, while those on our English toads usually belong to the genera Musca and Anthomyia.

While on the subject of toad-poisons in a former chapter, I unfortunately omitted a paragraph which I now supply: I am quite unable to say to what particular species of toad the passage refers, but there appears to be the strongest reason for believing that the poison in question is identical with the celebrated "wourali," of which so much has been written by the naturalist Waterton under the impression that the wourali was a plant. "The most deadly poison known to be used by the slaves in Brazil is that of the toad. The skin of this reptile contains glands which secrete in abundance a milky glutinous fluid when the toad is put to pain or irritation: this is scraped off and dried: it produces incurable obstruction and enlargement of the liver, and a speedy death. Some beat the toad with rods to make it secrete the venom, others place the animal in an earthen vessel over a slow fire."—*R. de Gambleton Daunt in the Dublin Medical Press for September* 25, 1861.

It is interesting to observe that while the ignorant of all ages have believed in the existence of this toad-poison, the men of science have almost universally treated its existence as a fable—a striking proof of the danger of setting up hypotheses in any department of science.

The toad occurs all over Great Britain, but has never been found in Ireland: it lives during the day under stones or in holes: when under flat stones it makes the smoothest possible cell or miniature cavern for its residence, the gallery leading thereto being often distinctly trodden, but never rendered beautifully smooth like their diurnal dormitory. I have found these cells four feet from the entrance of the

gallery: where there are no stones or other convenient shelter, toads make long galleries in earth or clay, and sometimes even occupy the excavation of a sand martin, the entrance to which could only be reached by perseveringly climbing an almost perpendicular surface. From these cells the toads emerge at night to feed, always returning to their retreat long before day dawn. This habit must, I think, have led to the innumerable accounts we find in newspapers of toads in stone, accounts which it would be quite as unwise to deny as to believe. The utmost that naturalists can do with a view to stem what might be called the tide of public opinion which flows so strongly in favour of these supposed miracles, is to ask the narrators for such evidence as would stand the investigation of a judicial inquiry: to such an inquiry no truthful mind can object.

The toad either crawls with great deliberation or if pursued moves forward by a series of merry but rather awkward jumps, never leaping to any great distance like the frog. It is curious how authors copy from one another without deigning to think or observe for themselves. All our naturalists have copied the popular fallacy that toads crawl but do not leap.

In the spring, toads—at least those to which the duty of continuing their race is entrusted—resort to the water for the purpose of spawning: the spawn is deposited in long double series, like necklaces composed of minute black beads strung on a transparent thread: these I have often observed stretching like network among aquatic plants in April and May. The tadpoles are much smaller and darker coloured than those of the frog: they also remain in the water much later in the year.

The torpidity of the toad is a favourite subject with natural historians, but scarcely rests on that sure foundation which the practical naturalist requires. There is no doubt that toads have been found in a frozen state during winter, and therefore perfectly motionless, but there is no evidence that the identical individuals so found have returned to a state of life and activity; again, toads have often been found, and indeed may commonly be found, deep within their galleries in the severest frosts, but when exhumed nothing like torpidity has been observed; so that the evidence of a fact so universally asserted seems very insufficient.

In 'Hardwicke's Science Gossip,' a work in which a world of Natural History information has been published, there are some

interesting accounts of toads, with one of which I shall conclude my history of the species. It is from the pen of Mr. Holland:—

"My toads, two in number, had lived for a year or two in a hot-house which was devoted to the growth of pineapples. They were, I think, first purposely placed there by the gardener, who found them very useful in destroying insects. I used very frequently to visit the place and amuse myself with feeding the toads with worms, and with watching their habits. The heat of the place, which was considerable, did not seem to inconvenience them in the least, for they were remarkably active, and of a large size; but at the same time they seemed greatly to enjoy the artificial showers when the plants were syringed, and would come out from their hiding places to be rained upon. They usually remained amongst the pineapple plants, which grew on a bed raised some four feet from the ground where they sat under the long leaves; but when the place was watered they would not unfrequently jump down and lie upon the cool wet tiles of the floor, spreading themselves out as flat as possible: how they climbed up to the pine-bed again I cannot say, for I never saw them do it. They evinced very little shyness, taking worms readily when offered to them. When feeding, their actions were very curious: upon placing a worm about three inches from a toad, it would instantly fix its attention upon it: then its whole appearance was changed; instead of the dull, lethargic-looking animal that the toad generally appears, it was all vivacity; the body was instantly thrown somewhat back, and the head bent a little downwards, its bright eye riveted upon its prey; and though the toad was perfectly still as long as the worm remained motionless or nearly so, yet its attitude and its eager gaze were full of life and animation. Directly the worm made any active movement the toad would dart forward, open its mouth from ear to ear, and seize it, generally about the middle. A curious scene now took place; mouth and feet went to work in good earnest, the worm was gulped down by a series of spasmodic jerks, trying to make its escape every time the mouth was opened, the toad thrusting it back all the time, and forcing it down its throat by the aid of its fore feet. Altogether it was rather a disgusting sight, and gave one the idea that the toad is an uncommonly greedy animal. Having got the worm down was by no means a reason that it would stay there, for I have sometimes seen a worm rather larger than usual make its way up again; however, the feet would immediately go to work a second time, and the toad would at length remain the undisputed possessor of its own

dinner. Frequently I used to cheat the toads by moving a small twig before them: they would seize it directly, imagining it to be a worm, and would regard it with stupid astonishment when they discovered their mistake. I never had the good fortune to see my friends take beetles or other small prey; but these, the gardener told me, were never seized with the mouth, but were caught with unerring aim upon the points of the long tongue."

EDWARD NEWMAN.

Lacerta agilis oviparous.—On the 30th of May, 1865, I captured a fine pregnant female of Lacerta agilis. Wishing to learn something of its habits I carried it home in a chip-box, and placed it in a fern-case which was well stocked with ferns: for the first two days it was very shy and refused all food, but on the third, on my offering it a living fly on the point of a long needle, I was pleased to find that hunger had overcome its natural timidity. Making a sudden dart at its victim, it seized it by the most accessible part and held it until it had ceased struggling. It then rubbed off the legs and wings against the ground, and after seizing it again by the head, swallowed it whole: this was repeated with eight common house-flies. It then commenced drinking water from a shell, lapping like a dog, and seemed to enjoy this much: when the shell was empty it licked the moisture from the fern fronds. When captured it was six inches long, light sandy brown in colour with darker markings. In a few days the skin assumed a dry shrivelled appearance and commenced separating at the mouth, from which it was gradually forced back by the creature pressing against the stipes of the ferns, the skin being turned inside out during the operation. From the vent to the extremity of the tail it came off in separate scales. After the change the colours were much darker, nearly as dark as the peat mould. On the 22nd of June she dropped seven eggs on the surface of the mould in the sunshine, which were in colour invisible-green above, lighter beneath, round, compressed, and five lines over. The egg-coverings were thin transparent membranes, and through them the young lizards could be seen curled up with their tails across their necks, and surrounded by a milky-looking fluid. The next morning these emerged, and after drying themselves in the sun, commenced running about in search of food. For the first two days they were of a uniform invisible-green above, a lighter green beneath; but on the third day they became freckled on the back with numerous lighter-coloured spots, which became more distinct as they grew older. There was not, so far as I could see, the least sympathy between the parent lizard and her young; in fact, she did not take the slightest notice of them from the time they were born until their death, which happened at the end of August, during their first change of skin. The parent became very tame, and would take live food from the fingers or lie curled up in the hand, apparently enjoying the warmth. On the 29th of September she ceased feeding, and remained in a torpid state up to the beginning of March, 1866. During the winter she lay on the surface of the mould covered over with a few leaves, the eyes being closed and the tail laid over the neck. On very cold days the body was quite rigid and to all appearance dead, but the warmth of the hand would restore animation for a short time: she commenced feeding again in March, but only lived to the end of that month.

On the 7th of July, 1866, I captured another female of Lacerta agilis, which again dropped *seven* eggs on the 22nd of that month. The young emerged from their shells in half an hour, lived until September, and then died in their first moult: I have several times since endeavoured to rear these creatures for the purpose, if possible, of ascertaining when copulation takes place, whether before or after hybernation, and how long the female carries her young. In my next attempt I failed through unfortunately introducing two males, which fought so desperately that each died of wounds inflicted by the other. In my last, I lost the female from the bite of a spider (*Epeira diadema*): it was an immense creature, and I had only introduced it out of curiosity to see if the lizard would attack one so large. She did seize it, but it immediately turned, and bit her in the lip; and, although she at once shook it off, she gradually became paralyzed, and died twenty-four hours after receiving the wound.—*Henry Moncreaff; Southsea, May* 2, 1869.

Variety of Anguis fragilis.—Having in my possession a full-grown blindworm (*Anguis fragilis*) of an unusually dark colour, with two irregular bands of bright blue spots running along the whole length of its sides, and having a broader head than is common to this animal, I should be much obliged if the Editor or any reader of the 'Zoologist' could inform me if this is owing to old age, or is indicative of a variety.—*A. de Hügel; Florian, Torquay, June* 6, 1869.

Sturgeons in the Severn.—Sturgeons have visited us early this season: about a fortnight since two large ones were caught by the fishermen in the neighbourhood of Oldbury-upon-Severn, and in accordance with custom they were forwarded to the Lord of the Manor of Thornbury; and on Saturday last one weighing nearly 130 lbs. was caught, by a fisherman, near Woolaston Station, in the river Severn. I saw the fish soon after it was taken out of the water: it was in very fine condition, and I much enjoyed part of it, which I purchased.—*Edward Sweetapple; Cone Mill, Lydney, May* 6, 1869.

A Monster Salmon.—This village is proverbially noted for the size and excellence of its salmon, but for this season at present, and for a half century of past ones, the palm must certainly be awarded to Mr. George Highnam, who caught on Friday last a monster salmon of the following extraordinary dimensions:—Length, 4 feet 8 inches; girth 2 feet ¾ inch; weight, 43 lbs. The fish was very bright in appearance, and capitally grown. Its quality we had not the opportunity of testing, but doubtless it was as rich as it was gigantic.—*Oldbury-on-Severn; May* 28, 1869.

Land and Fresh Water Mollusks, collected in the immediate vicinity of Henley-upon-Thames during the Season of 1868.—I have arranged the shells according to the systematic list in Lovell Reeve's 'Manual':—

Limax agrestis (Field Slug). Common.
Limax flavus (Yellow Slug). Common.
Limax cinereus (Ash Slug). Common.
Succinea elegans (Elegant Amber Shell). Not rare.

Zonites nitidans (Shining Zonite). Common.
Zonites crystallinus (Crystalline Zonite). Not rare.
Helix aspersa (Garden Snail). Common.
Helix Arbustorum (Shrub Snail). Common.
Helix nemoralis (Wood Snail). Common.
Helix hortensis, considered by Lovell Reeve a variety of H. nemoralis (Wood Snail). Common.
Helix cantiana (Kentish Snail). Common.
Helix virgata (Striped Snail). Common.
Helix fasciolata (Finely-banded Snail). Not rare.
Helix Ericetorum (Heath Snail). Common.
Helix lapicida (Variegated Rock Snail). Not rare.
Helix lapicida, *Var.* albella of Fleming. (White Rock Snail). Rare.
Helix rufescens (Rufous Snail). Common.
Helix rotundata (Rounded Snail). Common.
Bulimus montanus (Mountain Bulimus). Rather scarce.
Bulimus obscurus (Concealed Bulimus). Not rare.
Clausilia laminata (Laminated Clausilia). Not common.
Clausilia biplicata (Two-plaited Clausilia). Rare.
Clausilia nigricans (Reversed Clausilia). Common.
Pupa secale (Rye-grain Pupa). Not rare.
Pupa Muscorum (Moss-dwelling Pupa). Not rare.
Planorbis carneus (Horny Planorbis). Common.
Planorbis albus (White Planorbis). Common.
Planorbis carinatus (Keeled Planorbis). Not rare.
Planorbis complanatus (Smooth Planorbis). Common.
Planorbis Vortex (Whorl Planorbis). Not rare.
Planorbis Spirorbis (Rose Planorbis). Not rare.
Planorbis contortus (Twisted Planorbis). Rare.
Lymnæa peregra (Wandering Mud Shell). Common.
Lymnæa peregra, *Var.* ovata of M. Tandon, Not rare.
Lymnæa auricularia (Ear-shaped Mud Shell). Not rare.
Lymnæa stagnalis (Lake Mud Shell). Common.
Lymnæa palustris (Marsh Mud Shell). Not rare.
Ancylus fluviatilis (River Limpet). Not rare.
Cyclostoma elegans (Elegant Cyclostoma). Common.
Bythinia tentaculata (Tentacled Bithinia). Common.
Bythinia Leachii (Leach's Bythinia). Not so common.
Paludina vivipara (Marsh Shell). Common.
Paludina vivipara, *Var.* unicolor of Jeffries. Rare.
Paludina Listeri (Covered Paludina). Rare.
Neritina fluviatilis (River Neritina). Not rare.
Anodon cygneus (Swan Mussel). Common.
Anodon cygneus, *Var.* anatinus. Not rare.
Unio Pictorum (Painter's Mussel). Common.
Pisidium amnicum (River Pisidium). Not rare.
Cyclas rivicola (River Cyclas). Common.

Cyclas cornea (Horny Cyclas). Common.
Cyclas pallida (Oval Cyclas). Not Common.
Cyclas lacustris (Lake Cyclas). Not common.

In all, forty-nine species and four varieties. Besides the above, I collected specimens of the young of Paludina vivipara, Anodon cygneus, and Unio Pictorum. Taking the season all through, it was a very hot dry one, and not at all a favourable one, I should think, for mollusks.—*C. E. Stubbs; Henley-on-Thames, April* 12, 1869.

Persistence of the Scent of Aromia moschata.—Late in the summer of 1866 a lady, in one of her walks about here, met with a specimen of Aromia moschata, and, struck by its beauty, brought it to me to set it for her. A small phial with spirits of wine being close at hand, was the means of bringing the insect's life to a speedy end, and, if I remember rightly, the beetle was left a night in the phial. A few days ago the phial passed again through my hands, and I was struck by the concentrated perfume emanating from it. Every collector knows that this insect is a nosegay for a long time after death, but exact observations as to the duration of this quality seem to be wanting, as well as the knowledge of the real constituents of this volatile substance, which I was scarcely prepared to find holding its own so long a time, even in a preserving fluid.—*Albert Müller; Penge, S.E., May* 24, 1869.

A Hint respecting the Nematus-Gall of Rhododendron ferrugineum.—On the 30th of July, 1866, Mr. Stainton first met with this gall near Andermatt, in the Ursern Valley, and his courtesy enabled me soon afterwards to examine specimens and to offer a few particulars on the subject in the 'Zoologist,' (p. 1206, S.S.); but these specimens were too far decayed to give any clew to the insect. On the 23rd of June, 1868, and the days following, during a journey devoted almost entirely to the search after alpine galls, I had the pleasure of myself gathering plenty of these excrescences near the road above Hospenthal, in the same valley, at an altitude of about 4500 feet. The galls, looking with their glowingly red cheeks not unlike small sized whiteheart cherries of irregular shape, were most conspicuous amongst the sober dark green foliage of their foster-plants, which at that time only just began to expand their lovely blossoms. An examination of many specimens showed that at first they are filled with a spongy white substance, enveloping a solitary egg, and that subsequently, when this hatches, the larva begins to feed on the surrounding matter, thus gradually forming a chamber around itself. The location of the galls is either each separate upon a leaf or else in the centre of a top of a shoot, in which case the latter, instead of bringing forth its bunch of leaves or blossoms, produces a bundle of more or less crowded galls, *i. e.* converted leaves or blossoms. Taking into account all I have seen of this gall, I consider it to be the production of a sawfly, belonging probably to the genus Nematus; but although there is ample precedent for doing so, I abstain from burdening nomenclature with a new appellation,* which task I leave to the finder of the perfect insect, adding that it will probably occur in August or September, when sweeping the rhododendrons would probably lead to the desired result, for the

---

* Naturalists have over and over again bestowed specific names upon insects, of which only the galls or cases, &c., were known to them at the time they published their writings.

attainment of which I appeal to all entomologists who may happen to be in the sub-alpine region at that time of the year.—*Albert Müller; Eaton Cottage, South Norwood, S.E., July* 8, 1869.

Aphides seen at Sea.—On Saturday morning, July 24th, during the Ocean Race from Lowestoft to Hull, our cutter, when five miles S.S.E. of the Newsand lightship, and about thirteen miles from the Lincolnshire coast, ran through numerous belts of gray water, varying from a few yards to some hundreds in breadth, and extending both to port and starboard as far as the eye could reach. On examining a bucket of this water I found the peculiar gray colour due to myriads of aphides, with green bodies and light fragile wings, and that it was the extended wings of these little insects that gave the thick pea-soup appearance to the water. The sea was at the time comparatively smooth, and within the gray belts the surface was constantly broken and furrowed by the noses and fins of mackerel and pollack sucking down the flies —*John Cordeaux; Great Cotes, Ulceby, Lincolnshire, July* 26, 1869.

Plague of Aphides.—With regard to the floating masses of dead aphides seen at sea on the morning of the 24th of July off the Lincolnshire coast, I have since ascertained that about the same date this insect-scourge attacked the peas and vetches in this district in such immense swarms as, had it not been for the advanced state of the crops, to threaten their entire destruction. Myriads are now knocked from the plants during the process of reaping and gathering; and so thickly, in some cases, is the ground covered that they may literally be gathered in handfulls. I well remember, many years since, the advent of an extraordinary flight of ladybirds in this district: as near as I recollect they did not extend far from the coast, but all along the Humber embankment, and some short distance inland, lay as thick as hailstones after a storm: the ground seemed everywhere strewn with the little creatures, and they might very well have been swept up into heaps: the stems of ragwort and hemlock were concealed, so thickly were they covered; and along rails and gate-posts they crawled by hundreds and thousands.—*Id.*

Aphides in Lincolnshire.—With reference to the plague of aphides, which at the present time are doing so much damage to the crops in this district, I may further remark that they have not altogether been permitted to devastate our pea and vetch crop unmolested: their enemies are both numerous and enterprising: first and foremost in the war of extermination comes the "many-wintered" rook and his family—at this season usually so destructive to the corn crop; but now his old bad habits seem forgotten, or at least for the time laid aside, for I now see daily, as I pass through the fields, hundreds of black heads peeping up from amongst the late-sown vetches—wide-awake and trustless of peaceful appearances, ever on the watch for the dreaded gun. It must be a new sensation to these poor rooks not to be fired into, or disturbed by noisy rattle; but I know full well they are now all honest workers, day by day, early and late, stripping the green fly from the young and tender shoots of the vetch; and so much do they relish their work, that hitherto it has not been necessary to protect the fast-ripening grain; I can find no stray heads scattered on bank or pasture. With the rooks are associated flocks of starlings, and all equally well employed. But these are not all: during the last few days another foe to the aphides has come into the field—less conspicuous, but not the less deadly. In each plot of peas or tares, crawling over every part of the plant, I now find astonishing numbers of the larvæ of the ladybird; in many cases averaging ten or twelve on each plant,

and often four to five and upwards on a single pod. There are also many of the perfect insect, but the larvæ outnumber the parents as fifty to one. Thus do bird and insect combine to rid us of our foe; and, although the task seems almost hopeless and the victory doubtful, who can say that a check may not already have been given to this insect-scourge, and the decree gone forth—"Thus far shalt thou go, and no farther." —*John Cordeaux; August* 10, 1869.

A Swarm of Ladybirds.—On the 15th inst. this favourite little insect made its appearance in the streets and gardens of London in great numbers: in my neighbourhood they were very abundant, the juveniles being in active pursuit of them. I I observed a party of youngsters, who had converted a dry plug-hole into a sort of ladybird store: at the time I looked into it the plug-hole contained between three hundred and four hundred of the insects, the numbers being constantly augmented by the arrival every few minutes of a scout bringing fresh captives. On my way to London-bridge I must have seen thousands of the insects either on the wing, running about the roads, &c., or lying on the pavement crushed to death by the foot passengers: I believe they were all of one species, namely, Coccinella 7-punctata. On the following day, though not nearly so numerous, the street urchins were actively occupied in their collection: much to my amusement, I noticed one lad had armed himself with a yellow basin, into which he placed his captures, the said basin being enveloped in a red cotton pocket-handkerchief.—*Charles Healy; 74, Napier Street, Hoxton, August* 17, 1869.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

JUNE AND JULY, 1869.

Wheatear.—Considering how numerous this species always is on this coast in early April, it is somewhat surprising that so very few remain to breed: I am not aware of more than two pairs remaining for that purpose this season—one of these nesting amongst the rough-laid stones on the Humber bank, the other in a heap of heavy chalk-stones collected for the repair of the road. Am I correct in supposing the "sea-blue bird of March" of the Poet Laureate to be the male of this species? I know of no other bird answering the description, and "sea-blue" very truthfully represents the delicate bluish gray of the head and back of the male wheatear. I never see the little fellow flit past in the early spring without thinking of Tennyson's well-known lines—

> "When rosy plumelets tuft the larch,
> And rarely pipes the mounted thrush;
> Or underneath the barren bush
> Flits by the sea-blue bird of March."
>
> *In Memoriam.*

There has, I am aware, been much discussion as to what bird is intended: if not the wheatear, what is it?

Brownheaded Gull.—June 12. Already hundreds of this species, both old and young birds, have returned to the coast from the great gulleries of Twigmoor, near Brigg, Lincolnshire and Hornsea Mere, Yorkshire. There were also many young of the herring gull and the common species, with a few immature great blackbacked, on the "flats" by the 22nd; indeed, young gulls of all these species muster strong, and are unusually plentiful along the river. Either they have had a very favourable breeding season, or the "Bill" has already become effective in increasing the number of our sea-fowl. A man who lives close to the Humber says that there are now more young gulls on the "flats" than has been the case for very many years; and this is quite borne out by my own observation.

Lapwing.—June 12. I caught four young peewits this morning, evidently only a few hours out of the shell: in two of these little fellows the white ring round the neck was not nearly so distinct, and much duller—probably this difference is one of sex.

Whimbrel.—July 15. Whimbrel were passing over the house early this morning, flying south. This is a month earlier than I have observed them in previous years. I also heard their well-known note, when at sea off the Norfolk coast, near Cromer, on the morning of the 22nd; and on the 29th saw forty together in the Humber marshes.

Scoter.—Some flocks seen this morning off the Bull Light ship, Humber mouth.

Ringed Dotterel.—July 30. Seen in considerable flocks in the marshes.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
August 3, 1869.

Occurrences of the Crane in 1869. By J. H. GURNEY, jun., Esq.

THE Spring migration of 1869 having been marked by an unusual number of cranes, the Editor requested me to make a list of them.

About the 7th of May my father saw a crane at Mr. Ward's shop in Oxford Street, the property of Mr. Hume, who informed him that on the 2nd a labourer saw two cranes on a layer-field, near the border of the two adjoining parishes in which his estate lies, viz., West Somerton

and Winterton: the man shot one, and the other escaped; the one shot was a young male. Mr. Stevenson, who dissected it, informs me that the stomach contained large sized pebbles, fragments of beetles' wing-cases, and fibrous matter not distinguishable. This bird was mentioned in the 'Field' newspaper by Mr. Stevenson and Mr. Ward.

On the 22nd of May I received a young male crane, which had been shot on the 17th at Fiddrington, near Tewkesbury. I have already mentioned this individual (S.S. 1803).

On the same day a female was shot in the marshes at Wareham. Mr. Hart, who has recorded this crane in the 'Zoologist,' found in its stomach a quantity of aquatic shell-fish.

On the 25th of May another was shot and winged in the salt-marshes at Thornham, near Lynn, as noticed by Mr. Stevenson in the 'Field' newspaper. Mr. S. thinks it was probably a young male.

On the 27th (as has been recorded by Dr. Saxby, S.S. 1763) a crane was killed on the moors near Uyeasound, in Shetland, by a boy, with a stone: it was also a young male. Another was believed to have made its escape.

On the 4th of June a young male crane was shot on the South Pickenham estate, in Norfolk; notice of which, as it appeared in the 'Lynn Advertiser' for June 12th, is copied into the 'Zoologist,' (S.S. 1803).

About this date two are mentioned by an anonymous writer in the 'Field,' as having been shot at Burnham, in Norfolk; but it has been suggested to me that one of these may have been the Pickenham specimen. Two others are said to have made their escape.

As late as the 20th of last month (July) another young male crane (but with the darker feathers of the adult plumage beginning to sprout in all directions) was killed on Hickham Moor, near Lincoln, by Mr. Shuttleworth. This one I purchased, and have skinned for my collection: it was a very heavy bird, and in active moult. Length, 3 feet 8 inches; expanse 7 feet.

J. H. GURNEY, jun.

August 2nd, 1869.

Wild Animals eating Porcupines.—With reference to Mr. Thompson's paper in the present number of the 'Zoologist,' I find that tigers and leopards are not the only wild animals which, much to their sorrow, indulge a taste for porcupine flesh. The same circumstance, on the authority of Captain Campbell Hardy, is related of the North

American fisher (*Mustela Pennantii*), the largest of the tree martens. He says, "The Indians all agree as to its alleged habit of attacking and killing the porcupine. 'An old Hunter,' informs me that it is a well-known fact that the fisher has been often—very often—trapped with its skin and flesh so filled with quills of this animal that it has been next to an impossibility to remove the felt from the carcase. * * * Mr. Andrew Downe, the well-known Nova Scotian practical naturalist, says he has often found porcupine quills in the fisher's stomach on skinning the animal."*—*John Cordeaux; Great Cotes, Ulceby, Lincolnshire, August* 5, 1869.

Abnormal Dentition in the Rabbit.—A case somewhat, if not exactly, similar to that recorded by Baron A. de Hügel in this month's 'Zoologist,' with reference to the abnormal dentition in the rabbit, presented itself to me some time ago. On the 25th September, 1867, when cutting a field of corn, a rabbit was killed by the reaping machine, the teeth of which presented a remarkable appearance. The two large upper incisor teeth were bent round in contrary directions, not abruptly but gradually: each tooth formed nearly the same curve, which, if completed, would form a circle whose radius measured to the outside of the tooth would be about three-eighths of an inch; and, as the teeth were nearly semicircles, the distance from the extremities would be one and a half inch: such was the case. In the lower jaw there was only one tooth, not much longer than its normal size: there was a groove along each of the upper teeth, and the tooth opposite that in the lower jaw was a shade more sharply curved than that opposite the vacant space. I have not the skull in my possession now, as I unfortunately put it out on the top of the house to bleach, when some wandering hawk or owl spied it, I suppose: at any rate, I saw no more of my rabbit's cranium. Dallas, speaking in his 'Animal Kingdom' of the Rodentia, has the following: "And when one of the incisor teeth is broken away, the one opposite to it, being deprived of all check upon its growth, continues to increase in length like the tusk of an elephant; but as the form of the socket is the segment of a circle, the tooth is developed in a circular form, and may thus in time prevent the animal from taking any nourishment." P.S.—I should say the rabbit when killed was in a most emaciated condition.—*R. M. Barrington; Fassaroe, Bray, August* 2, 1869.

Shore and Sea Birds.—On the 22nd of May I was walking on the shore here, and observing three waders at a short distance, I, by a little manœuvreing, succeeded in getting within shot and killed two of them: they proved to be a pair of sanderlings in summer plumage. I was wishful to obtain the other bird, but could not then accomplish my object, consequently I took the earliest opportunity which presented itself, which was on the 25th: on this occasion it was blowing a strong gale from the N.E., and being spring-tide very little of the shore was exposed; I therefore had less difficulty in approaching the following birds, which I succeeded in shooting, viz., a male sanderling, a male Kentish plover, and a male knot: these were feeding in company amongst the seaweed which had been left by the tide, and were in their full summer plumage. I saw another Kentish plover at the same time, but it eluded me: I how-

* 'Forest Life in Acadie,' p. 191.

ever again went on the 28th, and, after a walk of about five miles, I had the good fortune to obtain a female Kentish plover, also a female sanderling. This Kentish plover I shot when flying along the edge of the water in company with some dunlins, one of which was killed at the same shot. I am not aware whether this is the first recorded instance of the Kentish plover being shot in Yorkshire, but it is the first I can hear of in this locality. I have since been down several times to the beach, but have not procured anything with the exception of a ringed plover and two or three dunlins, which are very common here. I had brought to me early last month, by T. Ling, of Flamborough (who is, I suppose, one of the greatest enemies our sea birds ever encounter), a male common buzzard and a male chough: these he had shot at Lundy Island, where he had been for the purpose of shooting kittiwakes and other gulls, for making into plumes, &c.: and he tells me that in two days, although a heavy sea was running, he succeeded in picking up to his own gun eight hundred of these birds. I think this alone is a strong argument in favour of the Sea Birds' Protection Bill, although Ling holds a different opinion, and does not see he is killing the goose that lays the golden egg.—*Thomas Boynton; Ulrome Grange, Lowthorpe, Hull, June* 14, 1869.

Notes on Migratory Birds.—March 19. Brambling last seen.

April 10. Wheatear seen.

April 11. Saw swallows. Heard willow wren, chiffchaff, and yellow wagtail. Goldcrest last seen.

April 13. Cuckoo heard.

April 18. Heard sedge warbler and tree pipit, and saw sand martin.

April 22. Fieldfares last seen.

April 27. Heard common whitethroat.

April 29. Heard lesser whitethroat.

May 1. Heard corn crake. The corn crake arrived about the 26th of April.

May 2. Heard garden warbler, wood warbler, grasshopper warbler, redstart and whinchat. Common whitethroats increasing. Swallows not numerous. Blackcap, swift, and house martin not yet seen.

Nearly all the Spring migrants have appeared earlier this year than usual. My last year's dates will be found in S.S. 1291. The cuckoo has seldom been heard in this locality so soon. A pair of swallows came to a shed here, in which they nest annually: the male on April 26th, the female May 1st: they are now building, May 15th. I should be very glad to ascertain, through the columns of the 'Zoologist,' how the swallow tribe occur this season in other parts of the country.—*George Roberts; Lofthouse, near Wakefield.*

Varieties of Birds' Eggs.—I have obtained this spring the following varieties of eggs, which I believe to be uncommon. The first is a nest of pale green redbreast's eggs, some of which are unspotted and some have a few pale reddish specks at the larger end; the second, some pale blue missel thrush's; and the third a nest of pure white house sparrow's eggs. I may add that all were taken in the vicinity of Brighton. —*W. W. Verner, jun.; 2, Victoria Terrace, Brighton.*

Position of Birds in Sleep.—Mr. Dix remarks that four chaffinches were brought to him dead—"all of them had their heads *under their wings*, as though they died asleep" (S.S. 1674); but it is a mistake to suppose that birds sleep thus: they thrust the beak and head into the scapular feathers above the wings, and not under them.

For confirmation of this, see Mr. Cordeaux's observations on the wigeon (S.S. 1666). —*J. H. Gurney, jun.; Bank, Darlington.*

Ornithological Notes from South Devon.—In continuation of the ornithological notes from South Devon (S.S. 1720) in the June number of the Zoologist,' may, I add a few of my own made in the same locality during the months of March and April: as they add a few arrivals of summer migrants to the list there given, they may be of interest to some of your readers. I did not notice any arrivals that struck me as especially early,—not earlier, indeed, than I have done here inland in Somersetshire. My first note was April 7th: saw a good many wheatears on the Den at Teignmouth; these remained only for a few days, and then departed, I suppose, for the Dartmoor Hills, for, on a ride to Hey Torr (one of those hills) on the 10th, I found wheatears there in considerable numbers. I saw the first swallow on the 9th of April near Topsham, on the Exe. On April the 10th I saw several more at Teignmouth; also a redstart, a hen bird; and heard the chiffchaff for the first time. The summer snipe or common sandpiper I did not see till the 14th of April: soon after this they became pretty common, both on the coast and up the river; first heard the cuckoo on the same day. First saw swifts on the 27th of April, near a village called Boney Tracey, between Teignmouth and the Dartmoor Hills. Up to the last day of April, when I left Teignmouth, great northern and redthroated divers were still tolerably numerous—nearly as much so as in the winter: one redthroated diver I shot on the 3rd of April was in a state of change of plumage—the gray feathers on the sides of the face and throat were rapidly supplanting the white, as were the red feathers on the fore part of the throat; this change appeared to be taking place partly by moult and partly by change of colour in the feathers themselves. A cormorant, shot on the 23rd of March, had quite assumed its summer plumage; most of the others I saw about were apparently in a state of change, the white spots on the thighs not being nearly so conspicuous. Common scoters were numerous at sea till quite up to the time of my leaving Teignmouth, as I saw several the day before I left.—*Cecil Smith.*

Our Feathered Friends.—The usefulness of small birds as destroyers of insects is thoroughly recognised by the Saxon Government, as is shown by a curious scene witnessed last week on the market-place at Dresden. A body of police suddenly made their appearance, and, without any previous warning, seized all the cages containing singing birds exposed for sale, and released their inmates. A decree has also been issued, forbidding, under penalty of a fine, the killing or trapping of these useful songsters, and containing especially severe regulations with regard to birdnesting.

[This is a step in the right direction, but there should be stringent laws to protect gardeners and farmers from their own suicidal persecution of these "feathered friends." —*E. Newman.*]

Effect of Cold on Birds.—The chilling effects of the north-easterly winds on Thursday and Friday last seem to have had a fatal influence on our Hirundines, for many, both martins and chimney swallows, were found dying and dead on those days: this did not appear to have been caused by hunger, for some of them were in good condition: previously to this we had few of either species. I could not detect any parasitical vermin on any of them. Another singular event occurred on those days: my poultry yard suffered much from the depredations of rooks (not carrion crows nor jackdaws), many of which were detected in carrying off young chickens soon after they were hatched. I thought both these circumstances were worthy of notice, and I shall

be obliged by your inserting them in the 'Zoologist.'—*Oswald Mosley; Rolleston Hall, Burton-on-Trent, May* 31, 1869.

Ornithological Notes from South Devon.—A fine male peregrine, also a female, were caught in a gin in this neighbourhood; the former on the 27th of May, the latter on the 3rd of June. Another not fully-fledged female of this species was shot near Watcombe, Torquay: a second young bird was seen at the same time. There is an eyrie near that place in the cliff, to which the above-mentioned birds most likely belonged, and it is said to be annually resorted to by a pair of these birds: there is also a peregrine's eyrie near Dartmouth, and another at Start Point.

Ravens. These birds have built in the cliffs at Watcombe from time immemorial: their nests are placed about half way up the cliff, and are difficult of access, although they and their contents are easily perceptible from the top.

Razorbill. A razorbill, still in the downy plumage, was shot in Torbay on the 7th of July: this fact would seem to prove Torbay (or rather the cliffs) to be a breeding place of this bird, although I have only received a negative answer to my inquiries from natives well acquainted with the Ornithology of this place and neighbourhood.

Glaucous Gull. One of these birds was shot last winter (January, 1869) in Torbay, as also another in the winter of 1867. Both these gulls were in the mottled, immature plumage: although this record of their occurrence is very tardy, they are birds of sufficient rarity to be worth even so late a notice.—*A de Hügel; Florian, Torquay, July* 16, 1869.

The Peregrine Falcon breeding in Lancashire.—I knew by repute that a pair of peregrines reared a nest of young in the Spring of 1868, on a rocky cliff beyond Hawkshead, and this year they had four young ones in the same place, one of which incautiously let its wing hang over the edge of the ledge it was upon, and a shot pinioned it, so that as it attempted to fly it came to the ground and was secured, and is now in my aviary a tame and magnificent bird: the other three were shot by "a keeper." The old birds are still at large.—*C. S. Gregson; Fletcher Grove, Stanley, July* 31, 1869.

Owl on Bishopsgate Church.—A few evenings ago, when walking near Bishopsgate Church about 7 P.M., I saw a white owl (*Strix flammea*), which, after hovering for a short time over the roof, alighted thereon: its appearance caused quite a commotion amongst its observers, many of whom evidently regarded it as a *rara avis.* Some persons whistled violently, and others hooted at it, expecting probably to frighten it away, but it walked about very deliberately, and seemed so much inclined to stay awhile that I was compelled to walk on without noticing its departure: a church mouse or two would doubtless have been very acceptable to it.—*H. Bloomfield, July* 22, 1869.

Missel Thrush.—The following observations may perhaps be worthy of record:—In April last, about the middle of the month, a pair of missel thrushes commenced building in a large oak in a garden at Tottenham. On the 16th April I observed one of these thrushes endeavouring to carry up to its nest a piece of white paper as large as half a sheet of full-sized note paper; but the wind was high at the time, and interfered with the bird's efforts, which, after repeated attempts, it at length abandoned. After the hen bird had commenced incubation the male became very noisy and pugnacious, driving off every other bird which settled on the oak in which the thrushes had built. On the 3rd May the male missel thrush disappeared, having probably been shot or captured by a bird-catcher. On the morning of the 5th or 6th May, the hen

missel thrush (who had continued her incubation notwithstanding the loss of her partner) was observed in company with a song thrush on an adjacent grass-plot: they were subsequently frequently observed to consort together whilst the missel thrush was bringing up her young: and once the song thrush was observed to fly into the oak containing the missel thrush's nest, with food in its bill. After the young missel thrushes had begun to fly, their mother and the song thrush were still frequently observed in company, and, as late as the 9th of June, I carefully watched through a glass the old missel thrush, two young missel thrushes and the song thrush, all sitting together within a yard of each other on some iron rails which divided the garden in which the nest was situate, from an adjacent field.—*J. H. Gurney; July* 16, 1869.

Late Singing of the Nightingale and the Cuckoo.—Rather an unusual thing has occurred in my garden this week, viz, a nightingale sings every morning about eight o'clock for half an hour or so, in a low irregular way—sometimes, however, breaking out in a good jug-jug-jug: it is, I should think, a bird of the year, judging from the time and manner of singing. The cuckoo sang here till the 7th ult.—four days late according to the old folks, who vow he never sings later than the 3rd of July.—*W. Farren; Rose Crescent, Cambridge, August* 7, 1869.

Number of Eggs laid by the Dartford Warbler.—I see in your number for this month a notice from a correspondent that a Dartford warbler's nest, with five eggs, has been taken near Brighton, and that an opinion exists with some that such never is the case. I have had, in the last few years, nearly sixty nests of this species: in four cases there were five eggs in a nest—four eggs certainly, as far as my experience goes, is the rule—but in eleven cases there were but three: of course it is difficult to say that there might not have been more laid if the nests had not been taken; but I have had at least one nest with only three eggs, and those hard set.—*Alfred Crowley; Bramley Oaks, Croydon, August* 19, 1869.

Rare Variety of the Great Tit.—I was down at the New Forest for a few days lately, and found in a keeper's possession, stuffed and cased, a very rare variety of the great tit (*Parus major*): the parts that are yellow and green in the type are pale lemon-yellow; the rest of the plumage quite white; bill pale yellowish flesh.—*W. Farren.*

Ray's Wagtail at Scilly.—Large numbers of the yellow wagtail have frequented the Islands during the past week.

Variety of the Yellowhammer.—On the 23rd inst. I received, in the flesh, a pale variety of the yellowhammer, the whole surface of its plumage being of a pale sulphur-yellow, the upper parts tinged with a pale reddish brown; eyes pale brown. Female, and in good condition.—*T. E. Gunn; Norwich, June*, 1869.

Extraordinary Jackdaw's Nest.—During the present season a pair of jackdaws, taking a fancy to a loophole in the tower of Hillington Church, near Lynn, as a site for their nest, but finding nothing but the winding staircase within as a foundation, have been at the pains of building thereon—piling up sticks for the purpose to the height of about twelve feet, and in quantity about a cart-load: the work of collecting and building this quantity of material was accomplished in about three weeks: the structure is so substantial as to completely blockade the staircase against all comers. —*Id.*

Albino Sand Martin.—I should wish to record in your next number an occurrence which I should imagine by no means common. On the 21st inst. I shot a pure white sand martin (*H. riparia*) near Ennis Kerry, in this county: the bird was young, and

probably had not left the nest more than a week: it was an albino in every respect, having pink eyes and being of a spotless white. Some one had fired at it before, as one of the legs was nearly off and the skin of the lower part of the abdomen much lacerated: it was a very conspicuous object, and was observed by many: had I not shot it, undoubtedly some one else would, and very likely some person who would not have taken the trouble to get it stuffed.—*R. M. Barrington; Fassaroe, Bray, July* 23, 1869.

Unusual Plumage of the Nightjar.—Last season I had the pleasure of examining an adult male of this species that had a blotch of white on the first four primaries in each wing, and an extra white-tipped feather on each side of the tail. This is the only instance that has come to my knowledge of the nightjar having this extra number of white spots. The bird is, I believe, still in the possession of the birdstuffer in whose shop I saw it.—*T. E. Gunn; June*, 1869.

Ash-coloured Woodpigeon.—During the latter part of February last, a woodpigeon with pale ash-coloured plumage was shot somewhere in this neighbourhood. The sex was not ascertained, but it was apparently a male.—*Id.*

Piebald Waterhen.—On the 9th of April last a female waterhen with a piebald head and neck was shot near this city.—*Id.*

Canada Geese at Yarmouth.—At noon on Sunday, the 13th June, a flock of wild geese were seen approaching from the northward, flying along the beach not more than twenty feet above the sands. The unusual occurrence at once attracted the attention of the crowds usually assembled near the jetty, who discharged a volley of stones at the new comers. Not relishing this sort of reception the geese made a slight *détour* seawards, passing within twenty yards of the end of the jetty, when they again made for the land, and flew in the direction of Mr. Cudder's house on the south beach, and having hovered over it a few seconds, they bore away for the marshes. The flock numbered fifteen, and were identified as the Canada or cravat geese.—*Id.*

Redbreasted Merganser.—On the 9th of April a pair of redbreasted mergansers (*M. serrator*), in adult plumage, were shot at Reedham.—*Id.*

Contents of the Stomach of a Redthroated Diver.—In dissecting an adult female bird of this species, shot on the 5th April on Hickling Broad, I found in its stomach four dace, varying from four to four and a half inches each in length, three perch, each three inches, and the mutilated remains of two gudgeons. The fish were swallowed entire after being smartly nipped: two of the perch were however so good in condition as to admit of being stuffed. I also found two long white worms, one of which I unfortunately broke; the perfect one measured 8½ inches in length, and 7-16ths of an inch in circumference: the worm is flat, with a slight groove or depression through the centre; the nose taper, but blunt. The bird was in rather thin condition, which suggested to me the appearance of worms; its plumage was in good order, having assumed the chestnut patch of its throat and slate-coloured head and neck, without the usual mixture of white feathers.—*Id., April*, 1869.

Spoonbill at Scilly.—At Trescoe Ponds, near the Lord Proprietor's residence, a spoonbill was observed to frequent the banks last month for a fortnight.

Notes on the Zoology of Newfoundland.

By HENRY REEKS, Esq., F.L.S., &c.

(Continued from S. S. 1759.)

Letter 4.—ORNITHOLOGY—(concluded.)

PROCELLARIIDÆ.

Fulmar Petrel, Procellaria glacialis, *Linn.*—Apparently common in its migrations, but I could not learn that it bred on the island.

Leach's Petrel, Thalassidroma leachi (*Temm.*)—Tolerably common, and probably breeds on some of the islands in company with the following species.

Wilson's Stormy Petrel, T. Wilsoni, *Bon.*—Appeared to be more common than *T. leachi*, and was said to breed on several islands along the coast of Newfoundland, especially at Port au Port; it is very probable, however, that some of these reported breeding places refer to the following species.

Stormy Petrel or *Mother Carey's Chicken*, T. pelagica (*Linn.*)—A common summer migrant, remaining probably until the appearance of the drift ice. Breeds on many of the islands round the coast.

Greater Shearwater, Puffinis major (*Faber.*)—I have never observed this species so far north as Cow Head, but it appeared tolerably common in the Gulf of St. Lawrence, on the west coast of Newfoundland.

Sooty Shearwater, P. fuliginosus, *Strick.*—Common on the banks of Newfoundland, but rather rare in the Straits of Labrador.

Manx Shearwater, P. anglorum, *Ray.*—Tolerably common, especially about the Gulf of St. Lawrence. The shearwaters are rarely, if ever, seen on the islands near the coast of Newfoundland. They are to be seen at all seasons in the Gulf of St. Lawrence, which has given rise to some curious ideas among the sailors, viz., that these birds *never breed*, or that during the breeding season the females retire to some *unknown* islands for that purpose. Their breeding stations are equally unknown to the settlers, but they are probably on some of the surf-bound islands on the "banks"—once the favourite resort of the great auk.

LARIDÆ.

Pomarine Skua, Stercorarius pomarinus, *Temm.*—Common, especially in the fall of the year.

Arctic Skua, S. parasiticus (*Linn.*)—Most common in spring and fall. This and the preceding are called "dung birds" by the settlers, evidently from the manner in which they persecute the smaller species of *Laridæ*, and devour not only their disgorged food but also their fœces.

Buffon's Skua, S. cepphus (*Brünn.*)—Appeared to be a rather rare periodical migrant, but it is difficult to distinguish the three skuas on wing, even with the aid of a good glass; from specimens obtained this species seems to be the rarest.

Glaucous Gull, Larus glaucus, *Brünn.*—Tolerably common in its periodical migrations, especially in the fall of the year, and during strong gales of north-westerly winds. It is called the "large ice gull."

White-winged Gull, L. leucopterus, *Faber.*—Like the preceding species a periodical migrant, and most common in the fall of the year.

Great Blackbacked Gull, L. marinus, *Linn.*—A common summer migrant, arriving towards the last of April and remaining until the drift-ice appears. It builds its nest of grass and rushes on rocks and small islands, most commonly in fresh-water ponds and lakes, but very frequently in similar situations in bays, &c. Provincial name, "Saddler Gull."

Herring Gull,* L. argentatus, *Brünn.*—Abundant throughout the summer, and breeds in similar situations, and often in company with the preceding and following species. It is called the "blue gull" by the settlers.

Ring-billed Gull, L. delawarensis, *Ord.*—Common throughout the summer. Provincial name, "squeezy gull." All the above species of *Larus* are carnivorous, but more especially *L. glaucus* and *L. marinus*. No sooner does a dead or dying bird appear on the surface of the water (the raven generally secures such prizes when washed ashore) than it is quickly espied by the gulls, which immediately commence squalling and in circling flights surveying their victim. Should it prove to be a goose or duck, or even one of their own species, the "old saddler" (*L. marinus*) usually commences operations; this it does, if the bird is quite dead, by standing *on* the floating body and picking first the neck and then the breast, and in a wonderfully short time the gulls devour every part of a fine fat goose except the bones and feathers: I have often watched the process in, I fear, a rather dog-

* Professor Newton informs me "that the American form of this bird has been of late regarded as distinct under the name of *L. Smithsonianus*."

in-the-manger spirit—having first killed or crippled the goose for them.

? *Bonaparte's Gull*, Chroicocephalus philadelphia (*Ord.*)—I have every reason to believe this little gull occurs occasionally in the Straits of Labrador. During the fall (Aug. and Sept.) of 1866, and again in 1867, I saw gulls (on wing) which I could refer to no other species, and the settlers, to whom I showed specimens of the following species, said they were larger than the "tickler,"—a small gull with which they evidently seemed familiar, and one which I think will prove to be this species.* As the species of some of the *Laridæ* in immature plumage are not easily determined, even by naturalists, there is room to doubt the testimony of fishermen, as well as my own, as to the identity of *C. philadelphia* with the provincial name "tickler;" at the same time I think it would be negligent on my part not to mention the evidence in favour of its occurrence on the coast of Newfoundland. Because so celebrated an ornithologist as Audubon did not see it, there is no reason why another person may not.

Kittiwake Gull, Rissa tridactylus (*Linn.*)—Tolerably common, especially in its periodical migrations. I did not hear of any breeding station on the island.

Ivory Gull, Pagophila eburnea (*Gmelin.*)—A very rare periodical migrant on the N.W. coast of Newfoundland. Two were obtained at Parson's Pond in January 1867, and another in January 1868; they were brought to me for identification, being unknown to the settler who shot them, and who, strange to say, killed all the three specimens. They were shot during a gale from the S.E., so that they must have flown across the island, which is narrow at this part, and not more than fifty miles from water to water.

Sabine's Gull or *Fork-tailed Gull*, Xema sabinii (*Sabine*).—A periodical visitor, but not common at Cow Head.

Caspian Tern, Sterna caspia, *Pallas.*—A tolerably common summer migrant, and breeds on many of the islands along the coast: I obtained eggs in the Bay of St. Paul. The settlers call it the "mackerel bird."

Wilson's Tern, S. Wilsoni, *Bonap.*—The most abundant species on that part of the coast which I visited. It arrives early in June,

* There is certainly a possibility that the American Black-headed Gull (*Chroicocephalus atricilla*) goes farther north than Massachusetts, and visits the coasts of Newfoundland; perhaps in company with *C. philadelphia*.

congregating and breeding on the coast islands as well as the mainland.

Arctic Tern, S. macrura, *Nauman.*—Rare at Cow Head; otherwise I confused it with the preceding species. Both are called "steerings" by the settlers—a name which their cry suggests. Some few small islands round the coasts of Newfoundland have been named "Steering" Islands from the number of terns which breed on them, although the name suggests a nautical derivation.

Least Tern, S. frenata, *Gambel.*—Apparently very rare. I only examined one specimen, which was shot about the 10th of September, 1867. This bird was probably blown across to Newfoundland by N.W. gales, which often prevail at that season.

SULIDÆ.

Common Gannet, Sula bassana (*Linn.*)—A very common summer migrant and constant attendant on the large shoals of mackerel and herring, which are migratory in spring and fall, the seasons of which are indicated to the settlers by gannets and gulls.

PHALACROCORACIDÆ—THE CORMORANTS.

Common Cormorant, Graculus carbo (*Linn.*)—A summer migrant and very abundant at some breeding stations along the coast.

Double-crested Cormorant, G. dilophus (*Swain.*)—Equally abundant as the preceding; both species fly in the form of the letter V reversed, and breed in colonies: *G. dilophus* is said to breed *in trees* in Hawk's Bay, Newfoundland.

COLYMBIDÆ.

Loon or *Great Northern Diver*, Colymbus torquatus, *Brünn.*—A very common summer migrant to Newfoundland, where it is called "Loo," *not Loon.* At this season nearly every lake and large pond is tenanted by its pair of loos; I say by *its* pair, because I believe the same pair, unless destroyed or continually disturbed, invariably return to the same site for many years. In 1867 a female loo hatched her two eggs on a rock in Parson's Pond, within gunshot of a house of one of the settlers. The house was not usually tenanted during summer, but some of the family were daily going to and from. The same pair of birds (?) had for many years hatched their young on this rock, which sloped gradually into the water, and was nowhere at that season more than a foot out of water. When built on an island, or by

the side of a lake, I have never known the nest more than three feet from the water, and very rarely so much: the birds are very awkward walkers, although wonderfully strong on wing, and breed on many of the lakes in the interior of Newfoundland; not only on the plains, but on the high table-land, upwards of two thousand feet above the sea. Loos are often taken in the salmon-nets of the settlers: I got a very fine adult male taken in this way on July 10th, 1867. The settlers easily "tole" these birds within gunshot by secreting themselves and waving a cap or red handkerchief. So fascinating is the red handkerchief that I have seen the same bird "toled" up within easy range, and shot at two or three times before it was killed: they are such expert divers, that they are far more easily toled than shot on the water. Young birds are sometimes so fat in the fall of the year, that I have seen the fat lining the inside of the skin average half an inch in thickness! The settlers affirm that there are two species of Loos; the great northern, which they call the "spotted loo," and another with the throat white, which is termed the "whitethroated loo," and which is distinguished from the young of *C. torquatus* in its first year's plumage by having the feathers on the back spotted with white instead of "margined with greyish white." Certain it is that plenty of such birds are seen every summer, *i. e.*, June and July; and, although the settlers say that they have found nests of the "white-throated" species (?), I am under the impression that they will prove to be non-breeding birds of *C. torquatus* in the *second* year's plumage —a state of which I have seen no description. The fact, however, of these birds being found at midsummer white-throated and with the back spotted is worthy of note, because the great northern diver has scarcely commenced laying at that season.*

Redthroated Diver, C. septentrionalis, *Linn.*—A common summer migrant, breeding generally in some of the smaller ponds in the marshes; placing its nest on a tussock of grass surrounded by water.

Podiceps——— ? A species of grebe was caught in the marshes near Cow Head by one of the settlers, and was considered a great curiosity by all who saw it. This occurred a year or two before I got there, and unfortunately no part of the bird was preserved: it was probably a straggler from the Labrador shore, as none have been taken since, neither could I learn of any previous capture.

* Adult specimens of *C. torquatus* had the bill *black* tipped with horn; while immature birds had the bill *horn-coloured*, with ridge of upper mandible *black*.

ALCIDÆ.

Great Auk, Alca impennis, *Linn.*—With this species I arrive at the most interesting of Newfoundland birds—once abundant, but now, alas! I fear extinct, or nearly so. Almost the sole object of my visiting the island was to collect further information from those who were likely to have met with this bird,—which is called "Pinwing"* by the settlers, and *not* Penguin, as Audubon informs us,—in a living state, and also, if possible, to visit the islands on the east coast, more especially Funk and neighbouring islands. The latter intention was, however, unfortunately frustrated by the severe accident I met with so shortly after my arrival, and, although I met several old settlers who had seen the living bird fishing in the mouths of Bonne Bay, Bay of Islands and Bay of St. George, none could with certainty tell me when the last was either seen or captured. I was, however, informed by some of the settlers that "a living pinwing was caught by one Captain Stirling about twelve years ago," but whether destroyed or not I could not learn: Captain Stirling was drowned and his vessel wrecked some seven or eight years since. I have no doubt this tale is true in the main; the only questionable part being the *exact* date, which, from my experience of these good-hearted people, is just as likely to have been fifteen or sixteen years ago as "about twelve." The fact recorded by Col. Drummond-Hay ('Ibis,' 1861, p. 397) of a living specimen of *A. impennis* being seen on the banks of Newfoundland so recently as 1852, and also of another picked up dead the following year in Trinity Bay, goes far to substantiate the statement of the settlers, and, I think, to fix the time at about that date. The settlers generally believe that the pinwing is *not* extinct, but such testimony cannot be of the slightest value, as they have no reason *why* it should not be so; neither have I, although I fondly—some will perhaps say foolishly—cherish the same belief, except that vessels have no object in going within several miles of the surf-bound and dangerous islands on the southern and eastern coasts, which are the

* Professor Newton tells me that more than ten years ago he formed the opinion (from the fact of the operation known as "*pinioning*" being called "*pin-winging*" in some parts of England) that the name "Penguin," or "Pingwin" as it is often also spelled, was but a corruption of the word Pin-wing, and had been applied to certain sea-fowl which being unable to fly appeared to have been "pin-winged." Until quite lately informed by me, he did not know that the Newfoundland name of *Alca impennis* was so pronounced as to give support to his theory.

most likely to hold the great auk at the present day. As Mr. Gurney ('Zoologist,' S.S., p. 1640) appears under the impression that the mummy of the great auk forwarded to the British Museum by Mr. J. M. Jones,* President of the Nova Scotia Institute of Natural Science, was "found by the Bishop of Newfoundland while on a missionary cruise at Funk Island," I will take the liberty of transcribing his lordship's letter to Mr. Jones as it appears in the 'Transactions of the N. Scotia Institute of Nat. Science," the more so as I wish to make a few remarks thereon. The italics are mine:—

"St. John's, N. F., August 10th, 1864.

"My dear Sir,—I am much pleased that the mummy arrived in a good state of preservation. How long it has been *embalmed or entombed in the ice* I cannot of course tell, but I understand the different specimens were found several feet (at least four) below the surface, and *under ice which never melts.* They were all found on the Funk Islands, but on which side I am not able now to discover, as the person who dug them up is not at present, I believe, in St. John's. He was sent, or went there to gather the guano or bird manure on speculation, with strict injunctions to procure, if possible, the bones or skeletons of the extinct bird. In this he succeeded better than in his own business, and probably if he had known the value attached to these specimens by naturalists he might have turned them to better account than the guano. One specimen I sent to Mr. Newton, and you saw by his letter how highly it was prized. Another was sent to Agassiz, and the third I have been enabled through the kindness of our Governor to forward to you: and this is the most perfect of the three, or certainly more perfect than the one I sent to Mr. Newton; the other I did not see.

"I think it very likely more specimens might be found, as no persons are living on the island; and it is only lately that any attempt has been made to discover and preserve the skeleton.

"Your's faithfully,

"ED. NEWFOUNDLAND."

* Of this specimen Professor Newton writes me that "it was originally intended to have been sent to me, but that having sailed for Spitsbergen just before the bishop's letter to me reached England, I was unable to let him have an answer for many months. I wrote to him immediately on my return home, and shortly after was inexpressibly mortified to find that not having heard from me for so long, he imagined

The parts of sentences italicised in the above letter appear to me rather conflicting observations. In the first place his lordship appears to have been informed, either directly or indirectly, that the mummies were, or rather the one sent to Mr. Jones was, "embalmed or entombed *in the ice*," and also that they were found at least four feet "*under* ice which *never melts!*" If the specimens were really "embalmed or entombed in the ice," it is right to infer that they were not originally Funk Island birds—*i. e.*, were not there in a living state, but that they died in high northern regions and *there* became "entombed" in ice which eventually *drifted* on to Funk Island, because the drift ice *only* remains unmelted until late in summer; that which is formed during winter on the coasts, or on the islands along the coasts of Newfoundland, *soon melts* on the approach of summer. Again, on the other hand, it is new to me, and contrary to my experience, to find that ice, even from high northern latitudes, when drifted to and piled on an island by the winds, only a few feet above sea-level, and in the same latitude as the extreme south of England, should *never* melt! In all probability ice has drifted on to Funk Island for many hundreds, or perhaps thousands of years,—as long, at any rate, as the pinwings have used it for a breeding station, but at the same time I consider it *quite* as probable that the ice *melted annually* before the birds commenced breeding. It hardly seems reasonable that birds which make little or no nest should select an island and deposit their eggs on ice which "never melts," when plenty of adjacent islands were quite free from ice at that season. From the fact of the specimens being found under ice so late as June or July, the man who dug them up was probably impressed with the idea that the ice was a permanency on the island. For further particulars respecting the great auk on the coasts of Newfoundland I must refer my readers to two papers by Professor Newton,—one in the 'Proceedings of the Zoological Society' for 1863, and another in the 'Natural History Review' for October 1865,—the latter being a capital *résumé* of and commentary on previously published matter.

Razor-billed Auk, A. torda, *Linn.* — Common throughout the summer and fall; in fact, until driven south by the drift ice. It is called a "tinker" by the settlers.

I did not care to have a second specimen, and so sent it to Mr. Jones, by whom it was given to the British Museum, where its skeleton—a very perfect one—is now to be seen."

Common Puffin, Mormon arcticus (*Linn.*)—Common in the summer, but most abundant in the fall. It is the only species of puffin I obtained, but the settlers say a larger puffin is also found there in the fall of the year, which is probably *M. glacialis*, Leach.

Black Guillemot, Uria grylle (*Linn.*)—A very common summer migrant, remaining until after assuming its winter plumage, and migrating only on the appearance of drift ice. Provincial name "pigeon."

Common Guillemot or *Murre*, U. lomvia, *Brünn.*—A very common periodical migrant, breeding plentifully on islands on the north coast of Newfoundland, and along the Labrador shore. I was unable to identify *U. ringvia* as more than a common form of *U. lomvia.*

Thick-billed Guillemot, U. arra (*Pallas*).—Equally common with the preceding. Both species are called "murres" and "turres" by the settlers.

Little Auk, Mergulus alle (*Linn.*)—A very common periodical migrant, arriving in October and remaining until driven farther south by ice. Provincial name "bull-bird."

In the above list two hundred and twelve species have been enumerated, nearly all of which I have identified as belonging to the avi-fauna of Newfoundland. That the subject is anything like exhausted I am far from thinking; although perhaps some years may elapse before this list is materially added to, yet there is much to be learned on the economy and migrations of some species. Why many of the Charadridæ, Scolopacidæ, &c., which are supposed to breed in Alaska, or even in the Arctic Circle, should be so abundant in Newfoundland during the autumnal migrations, and yet rarely or never observed on the vernal migration, I am unable to explain. Nevertheless, it seems pretty evident and perhaps natural that a more direct route is taken at that season. Prof. Baird is of opinion (I presume from evidence adduced) that the vernal migration is by way of the Mississippi valley; thence by the great lakes in the Hudson's Bay territories. Be this as it may, it is wonderful that a station (say for argument Bahama Islands, or any of the West India Islands) used as winter quarters should be annually resorted to *viâ* Newfoundland and Bermuda, and that Alaska, or territories within the Arctic Circle, should also annually be visited in summer by a route several hundred miles westward of that (the Newfoundland) invariably adopted in the fall of the year. I trust naturalists in Newfoundland and the British Provinces

will *carefully* note those species which pass southward in the autumn, and *especially* those which reappear in the spring: I allude here, of course, only to those species which are known to breed far north, although the migration of species will be found one of the most interesting studies in the economy of animal life.

HENRY REEKS.

Thruxton, Andover.

Ornithological Notes from Suffolk. By ALEXANDER CLARK-KENNEDY.

JANUARY, 1869.

Green Sandpiper.—During the last two months half a dozen green sandpipers frequented some low meadows at Wickham Market, which are intersected by numerous small ditches; I often disturbed them near a certain old post and rails which cross one of the streams, and noticed that they usually fed in company, but when flushed flew off in different directions, ascending to a great height, and returning again one by one to their old feeding ground: I could have shot them all many a time, but I hoped to see them breeding in this neighbourhood during the summer, and a friend had already procured a pair for me from this same locality.

Herring Gulls.—Were extremely numerous during the past winter, flying long distances from the sea; and many of the common, and a few brown-headed, gulls paid visits to the lakes and ponds in the interior of the county.

Wild Fowl.—Owing to the extraordinary mildness of the weather, few fowl of any kind put in an appearance on the rivers; but, a few days after Christmas, there was a short and sharp frost, which drove mallard, wigeon and teal, with a few immature, and fewer adult, goldeneyes, into the Woodbridge river; where, however, they were very wary, and the punt-gunners were not successful in obtaining many birds.

House Sparrow.—A black variety of this common species was killed near Melton, towards the end of the month, and several pied examples have also been met with.

FEBRUARY.

Wild Fowl.—On the 25th January we experienced a sharp frost, and several rare ducks were observed among the commoner kinds on

the Alde. An eye-witness informed me that the reaches of the river between Iken and Snape were literally swarming with mallard, duck and wigeon. This man, who went out after the birds in a punt *minus* the punt-gun, killed with a small single barrel over thirty fowl in one day, among which were three goldeneyes and a bird which he described to me as the "white-winged wigeon," which had never been seen on the river before by any of the gunners, and it seems that no one knew its proper name. Unfortunately I had no opportunity of examining it, as the man had sold it before I knew of its occurrence. Teal, curiously enough, do not seem to have made their appearance during this spell of cold weather, either on the rivers or in the little streams and reedy brooks, to which a frost often drives them. A few shieldrakes were observed on the river about this time, and the shooter, to whom I have before referred, managed to kill three at one discharge of his gun, two of which were old females and the remaining bird a very fine male, of unusually heavy weight. A "skein" of bean geese were seen in some pea-fields and fallows near Iken, but none were shot; and small companies of the tufted duck were noticed near Aldeburgh, and I believe some few scoters, but I do not think any of the latter were obtained. Snipe were very plentiful on the "saltings" while the few days of cold lasted, but on the 10th February I could scarcely find a bird. Jack snipe were common during the winter, and I believe I must have killed quite sixty of these little fellows since the previous October in the marshes near the river.

Brownhooded Gull.—On the 13th February, owing to the heavy rains which fell during the previous day and night, the meadows near the Alde and its branches were laid under water for many miles, and the floods attracted an immense number of gulls and plovers from their usual haunts near the coast. The gulls seemed principally to be Larus ridibundus, with a few common and herring gulls intermixed. Neither of these latter associated with the peewits, but the brown heads did so, flying about in company with the plovers and sitting near them on the grass. The "peewit gull" is a local name for this bird: I amused myself by watching from behind a hedge a flock of about eighty of these pretty little gulls as they circled around in the air; when one would dash down almost like a hawk until within a few feet of the water, then suddenly rise for a moment and hover, until dipping its blood-red bill into the stream some floating garbage or small fish was secured. At this date the black, or rather brown, hood was not yet assumed; but two birds which I shot showed signs of an

approaching change of plumage. On the 14th but very few gulls were left in the marshes, and on the following day the whole community had disappeared together with the temporary lake, and only a pair of common gulls were observed where the day before there were hundreds.

MARCH.

White Sparrow.—An albino house sparrow was seen by the Rev. W. Freeman, near Marlesford, early in the month.

Hooded Crow.—These crows began to leave us on the 2nd, and by the end of the week not one was to be seen in their old haunts on the "saltings" near the river.

Heron.—On the 2nd I paid a visit to a large heronry near here, one of the few still existing in this county, where these noble birds have been protected, it is said, for nearly a century. After some hesitation the old gamekeeper allowed me to walk through the heronry, for permission is seldom accorded to strangers to do so, as the proprietor is exceedingly anxious the birds should not be disturbed. As we entered the wood of fine fir trees, the birds—to the number of about eighty—rose from the branches on which they had been resting, and silently circled high above our heads. Now and then one of them, catching sight of my retriever, swooped at him with a hoarse cry. The birds were then beginning to repair their old nests, and in some instances to build new ones, but the former, when annually patched up, are made to do service for several seasons. No eggs were yet laid, owing to the cold weather which had prevailed during the previous three weeks. The nests differed little in size, one to which I climbed being three feet across, and composed of decayed fir branches and large twigs, with a little wool for a lining: on some of the trees there were as many as ten nests, and in almost every instance more than one nest was placed on the same tree. Wood pigeons, carrion crows, with a few kestrels, seem to live in perfect harmony with the herons, their nests often being within a few feet of those of their larger neighbours.

Yellow Bunting.—An unusually large flock, numbering many hundreds of these birds, was observed on the 6th; they allowed me to approach within a few yards before they took flight, then only moving their quarters about thirty yards.

Redshank.—A small party of redshanks returned to their summer haunts on the 10th, and by the 25th many hundreds were to be seen near the marshes where they breed.

Peewits.—The first were noticed on the 17th, and by the 20th some were paired and flying about near their breeding ground.

Missel Thrush.—On the 20th an old missel thrush was sitting on a nest containing four eggs, although it was snowing hard and the ground was quite white.

Brownhooded Gull.—On the 23rd one flew close past me with its brown hood perfectly completed, but I saw others in which the change was only partially effected.

Jack Snipe.—I shot the last which I saw this spring on the 23rd, my dog flushing a second at the same time: the russet colour, which characterises the summer dress, was beginning to be assumed on the neck.

APRIL.

Greater Spotted Woodpecker.—A female of this species was killed by one of the gamekeepers in Little Glemham Park on the 30th, and I procured it from him: it showed signs of sitting, and I fear it had a nest—perhaps full of young.

Snipe.—On the 23rd I saw a "full" snipe for the last time, having put one up several times during the previous week.

Spring arrivals.—The house martin was first seen on the 22nd; swallows and sand martins a few days previously; redstart on the 21st; nightingale on or about the 20th; and red-backed shrike towards the end of the month.

Godwit.—On the 24th, the earliest party of bar-tailed godwits made their appearance on the mud "flats" of the Alde.

Whimbrel.—I noticed the whimbrel for the first time this year upon the same day, the 24th.

MAY.

Golden Oriole.—On the 5th of the month a hen of this handsome species was shot in a plantation a few miles from Woodbridge. On the 31st, as a friend and I were walking in a quiet lane near Parham, a bird, which I am almost certain was an oriole, flew over our heads and alighted in a clump of trees a few hundred yards off: it was of an extremely bright yellow, and the sun was shining at the time, giving the bird a beautiful appearance.

Redbacked Shrike.—In the stomach of a male which I shot on the 24th I found a mass of beetles, with feathers and undigested bones of a hen chaffinch.

Swift.—First seen, at Great Glemham, on the 8th.

Turtle Dove.—I noticed the first flock of these doves on the 6th,

from which date they steadily increased their numbers by fresh arrivals.

Redshank.—Eggs of this bird were found during the whole month, and I saw the first young on the 21st, and fresh eggs were found by a friend on the following day.

Terns.—The common, arctic and lesser terns returned to their old breeding grounds on the pebbly tract of beach between Aldeburgh and Orford, but I could find no eggs when I paid a visit to the spot on the 25th, the cold winds having doubtless retarded the breeding of many of our sea birds.

Ringed Plover.—Eggs found throughout the month, and in many cases young hatched.

Swallows and Martins.—On the 28th and 29th of this month, owing to the bitter winds and rain, many of the Hirundines suffered badly: swallows, martins and sand martins being found dead on the roads and in gardens near Glemham. Dr. N. F. Hele informed me that the same diminution of their numbers had been observed at Aldeburgh; and the accounts from other places tally as to the great sufferings of these little birds on the dates above-mentioned.

JUNE.

Redshank.—My retriever found a nest with fresh-laid eggs on the 9th, and several others from which the young had gone, so I conclude that this must have been a second laying.

Common Gull.—A large flock of this gull appeared at Iken on the 9th: it is a common bird in the autumn and during the winter months, but in summer is not often seen: so far as I could ascertain all were adult birds.

Heron.—At this date young birds were beginning to take long flights with their parents.

Kentish Plover.—A pair were shot on the 1st of the month by a friend of Dr. Hele's, near Aldeburgh: it is one of the rarest birds on this coast.

Pied Flycatcher.—I saw a male flying about upon the beach, near the little village of Sizewell, between Aldeburgh and Dunwich; this was on the 12th, which was not a warm day, and the wind was easterly.

ALEXANDER CLARK-KENNEDY.

Golden Eagle in Norfolk.—A correspondent in the 'Field,' of December 19, 1868, announced that a golden eagle had been found dead in the Stiffkey Marshes, in this county, and, though in a state of decomposition when discovered, that the sternum and feet were preserved. I have since had an opportunity of examining one of these feet, by which the speciesis clearly identified; and I am now enabled, for the first time, to record the occurrence of this eagle in Norfolk. The history of this specimen appears to be as follows:—It was first seen in November lying dead in the marshes, on the property of Mr. P. Bell, of Stiffkey, by a fisherman named Green, who mentioned the fact to Mr. T. J. Mann (the 'Field' correspondent), who was at that time shooting in the neighbourhood: he immediately visited the spot and secured such parts as were most likely to identify the species, the carcase being then too far gone for preservation; but, from his description of the tail-feathers, "chesnut brown, shading off to a perfect black at the tips," it was no doubt an adult bird. The foot sent to me in January last, by Mr. Mann, had the toes still supple, as if taken from a recently killed specimen; and from its small size, though having formidable talons, I have no doubt, on comparing it with the fine series of golden eagles in the Norwich Museum, that it belonged to a male bird. I could not ascertain at the time, either locally or from the Journal, that any eagle of this kind had escaped from confinement; and I suspect, therefore, from the locality in which it was found, close to the sea, that it was the victim of some random shot off the coast, and died almost as soon as it reached the shore.—*Henry Stevenson; Norwich, Sept.* 13, 1869.

Capture of the Eagle Owl in Norfolk.—I had the pleasure of seeing a magnificent specimen of that rare English bird the eagle owl (*Bubo maximus*), in the flesh, at Mr. E. Ward's, Wigmore Street, on Monday. The expanse of the wings was 5 ft. 8½ in. This specimen was shot on Saturday on the coast of Norfolk, and was sent to be preserved by Mr. T. F. Buxton. This grand bird, which preys on fawns, hares, grouse, &c., is a resident on the continent of Europe generally, particularly the mountainous parts; skins have also been received from China and Astrakan. It is not an uncommon bird in our vivaria, but can only be regarded as an occasional visitant to the British Isles; though specimens have been shot in most of the counties on the eastern coast. The bird is apparently a female, and it exceeds the dimensions given by Macgillivray.—*W. B. Tegetmeier* (*in Field*).

[This subsequently proved to be an escaped specimen.—*E. N.*]

Snowy Owl in Ross-shire.—A male bird of this species, adult and in the moulting stage, was shot in Beaufort Castle grounds, near Beauly, Ross-shire, on the 21st of August this year. I saw the bird in the flesh in Inverness, at Mr. M'Cleary's, bird-stuffer, to whom it had been sent for mounting.—*A de Hügel; Gairloch, Ross-shire, August* 30, 1869.

Woodchat in Kent in 1868.—For several days during the month of July, 1868, a woodchat shrike had been known to frequent gardens in the neighbourhood of Faversham and Murston, but for a time all endeavours to shoot the bird were unavailing, as it was extremely wild. Towards the end of the month, however, it was seen upon a cherry tree in an orchard at Murston, by Mr. N. Barlow, who killed it, and took it to a local taxidermist, who informed him it was a common bird and of no value; but as soon as the possessor of the rarity had departed the unscrupulous dealer sold it to a gentleman who well knew its worth for a large sum.

My friend, who is not an ornithologist, afterwards found that he had been cheated out of a fine male specimen of one of the rarest birds that visit this country.—*Alexander Clark-Kennedy; September* 11, 1869.

Fieldfare's Nest at Alresford.—Colonel Hawkins having written me word that a pair of fieldfares had built their nest and brought up their young ones in the rectory grounds at Alresford, I suggested the missel thrush. Col. Hawkins has since sent me the nest, and also a note from the Rev. J. H. Swainson, whom your readers will be interested in knowing is the brother of the celebrated and lamented naturalist of that name. The nest is certainly very similar to those described by Hewitson as belonging to the fieldfare. In his note to Colonel Hawkins Mr. Swainson says:—"Seeing a strange-looking nest of loose twigs on the lower fork of the boughs of a medlar tree on my lawn, about seven feet from the ground, and the idea crossing my mind that it was not unlike what I had heard of a fieldfare's nest, I asked my gardener 'What nest is that?'. He immediately replied, 'Oh, sir, two fieldfares built there this spring; I should have destroyed it, but Mrs. Wing wished me to leave it.' I said, 'Are you sure they were fieldfares?' He answered, 'Yes, sir; I saw the birds often about.' 'But,' I inquired, 'did you see them on the nest?' 'Yes,' was the reply again; 'the cock bird used to be picking about, while I could see the hen on the nest.' After you and I had had some conversation upon the subject, I also asked him whether either of the birds seemed lame or weak on the wing; but he replied that there was nothing particular about them. This was all he knew; he had not looked into the nest to ascertain how many eggs were hatched, nor did he see the young ones fly. But he was quite certain they were fieldfares, and I am quite satisfied that we may depend upon his testimony." The gardener's testimony is of value, provided he was quite certain that the bird was not a missel thrush, and that he was capable of distinguishing between the two.—*C. R. Bree (in the 'Field').*

Fieldfare's Nest at Alresford.—In corroboration of the nest at Alresford (mentioned in the 'Field' of June 12) having been that of the fieldfare, I send the following:—(1) Mr. Swainson suggested to the gardener that the nest was that of the missel thrush; but the latter immediately pointed out a real missel thrush's nest on an adjoining tree, thus most satisfactorily showing that he well knew the difference between the fieldfare and missel. (2) Col. Hawkins saw on Sunday, the 6th of June instant, a pair of fieldfares mobbing a jay. Col. Hawkins knows the bird well, and says he could not possibly be mistaken. This was in the Alresford coverts, which adjoin the rectory garden, where the nest was built. Col. Hawkins did not see any young birds, but he was quite sure from the hostile manœuvres of the old bird that they were near. I think we may conclusively state that this is a well-attested and proved case of the nidification of Turdus pilaris in this country; and it is interesting, for the event is very rare. The birds will, I think I may venture to say, not be shot at Alresford; so they will have a good chance of breeding again.—*Id.; Colchester, June* 18, 1869 (*in the 'Field'*).

Golden Oriole in Kent.—There was shot on June 2, by Mr. Wiggins, keeper, Louthfield Park, Tunbridge Wells, a fine female golden oriole (*Oriolus galbula*). On examination I found the bird must have had a nest of eggs or young ones at the time it was killed.—*Edwin Ward; 60, Wigmore Street, Cavendish Square (Id.)*

Golden Oriole near Horsham.—The keeper here shot a male golden oriole one day this week: I am having it preserved by Mr. Richardson, of Horsham. Will you in-

form me whether it is very rare, and when and where it has been seen or shot?—*F. N. Pigott; Bones Hill, Horsham, May* 12 (*Id.*)

[Several specimens have been observed near the Land's End this spring.—*E. N.*]

Robin and Wigeon breeding in confinement.—As neither of these birds frequently breed in confinement I send you the following notice of their doing so for insertion in the 'Zoologist.' Until this year I have never been able to keep a pair of robins in my aviary, as one always killed the other; now, however, I have not only succeeded in doing so, but they have actually made a nest and succeeded in rearing a brood of three young ones. One curious fact connected with the robins is that they established a connexion with a robin outside, who constantly supplied them with food through the wire netting: as the aviary is close under my dressing-room window, I had frequent opportunities of watching this curious proceeding. I have a pair of wigeon in the pond, but until this year they never attempted making a nest, though the drake was always very attentive to and jealous of the duck; this year, however, the duck made a nest in a field of mowing grass and laid five eggs, and sat on them for nearly a month: the eggs, however, were unfortunately addled, probably because the bird was so often driven from her nest by mowers and haymakers: the nest was on the ground in a thickish clump of grass made of a few long bents twisted together and lined with down from the bird's own body, looking, consequently, much like the nest of the Muscovy duck: the eggs are a rich cream-colour, smaller and much more pointed than those of the wild duck—two inches two lines in length, and one inch five lines in breadth at the broadest part.—*Ceeil Smith; Lydeard House, Taunton.*

Beautiful Variety of Nightingale's Eggs.—In June last a friend took a nest of the nightingale, containing five eggs, in a wood at Hetherset, near Norwich: four of the eggs were of a beautiful rich blue colour, spotted with red on the larger end; the fifth egg was of a pale olive, spotted and streaked with darker olive colour. One of the former and the latter my friend kindly presented to me. The blue variety of the nightingale egg is, I believe, of rare occurrence.—*T. E. Gunn; Regent Street, Norwich, September*, 1869.

Painted Bunting in Oxfordshire.—A note of mine in your last week's issue, on the occurrence of the painted bunting (*Spiza ciris*) in this neighbourhood, has called forth questions from several of my acquaintances. My offence consists in having intimated a doubt as to whether this species has ever occurred in Britain otherwise than as an escaped cage-bird. I see in the 'Zoologist' list of birds only one instance of its occurrence mentioned. As I believe that it has occurred in Britain several times since, perhaps those of your readers who have met with specimens will let us know in what state they were, and if they showed any signs of captivity.—*Everard F. im Thurn; Adderbury Rectory, June* 8, 1869 (*From the 'Field'*).

Brambling breeding in confinement the second time.—In the 'Zoologist' for 1868 (S.S. 1218) I recorded the fact of a pair of bramlings breeding in confinement in this city: I have again to notice that the same pair of birds has nested this season, two eggs being laid, which, after a day or two, were forsaken.—*T. E. Gunn; Sept.*, 1869.

Serin Finch at Worthing.—A very fine example of this rare English visitant was shot at Worthing on the 4th of May, 1869. It has been very carefully mounted, and has been kindly sent by Mr. Frederick W. Lucas to our office, where it may be seen. The serin finch has only been captured a few times in England, and is not noticed by Macgillivray or Yarrell, but is described in Newman's Montagu. Although so

rarely seen in England, a specimen captured in this country was living in the Zoological Gardens in 1866. The serin is a common cage bird in Germany.—(*From the 'Field.'*)

White Sparrow in Norfolk.—An entire white sparrow (*Passer domesticus*), immature, was shot at Cromer on the 21st of August.—*T. E. Gunn.*

The Plague of Sparrows.—Spare your kestrels; that is the best advice I can give: I believe that hereafter there must be a "Hawk Preservation Act;" the complaints of the increase of wood pigeons and sparrows are becoming general: this increase is entirely owing to the wanton destruction of birds of prey.—*Edward Newman.*

Rose-coloured Pastor in Somersetshire.—A specimen of the rose-coloured pastor (*Pastor roseus*) was shot on the 29th July in the garden of the Rev. A. B. Russell, Rector of Laverton, Somerset. At the time of being fired at, it was apparently feeding on currants (*From the 'Field'*).

Rose-coloured Pastor.—It appears from a note in the 'Field' that a specimen of Pastor roseus was shot near Somerset: there is no doubt about its feeding on the currants, as mentioned: its fondness for fruit is well known. I have a very beautiful bird of this species, which was shot whilst feeding on the berries of the elder tree: it was completely gorged with them.—*J. J. Briggs; King's Newton, Swarkeston, Derby.*

Cuckoo in a Swallow's Nest.—In the early part of August four or five young swallows, apparently just hatched, dropped from the interior of a high chimney of a country seat. About a fortnight afterwards, to the great surprise of the inmates, a young bird of considerable size, nearly fledged, dropped down the same chimney and came sprawling on to the kitchen floor. The young cuckoo—for such it was—was brought to me still alive: no doubt it had turned out the young swallows as soon as hatched, and perhaps in attempting to reach the chimney top had itself fallen.—*Henry Nicholls, jun.; Kingsbridge, South Devon.*

A Baby Dove Incubating.—On the 21st June a pair of African turtles (*Turtur risorius*) produced a single young one, the contents of the other egg being dried up (not addled). On the 22nd July the female was again observed sitting, and on the 24th I observed both male and female at liberty, and of course supposed that some casualty had caused them to desert; but no! on looking up at the nest—for it is higher than I can look into or reach—I saw the head of the young one, and his bright eye was looking down on me with an air of perfectly *maternal* solicitude and suspicion. On Sunday morning at eight the male dove was on the nest, and the female and young at liberty; but at two in the afternoon the young one again occupied the nest, and both the parents were at liberty, billing and cooing with great zeal, as though rejoicing in the precocious propensities of their progeny.—*Edward Newman.*

Crane on the Devon Coast.—A specimen of the common crane (*Grus cinerea*) has been frequenting the high-level fields near the Start Lighthouse, on five or six successive days: it was very shy and kept in the middle of the fields, frequently in company with the sheep. A friend of mine shot at it twice, but without effect.—*H. Nicholls, jun.; Kingsbridge, South Devon, Sept.* 13, 1869.

Green Sandpiper on the Norfolk Coast.—A small flock of the green sandpiper was seen about the Yarmouth marshes on the 13th of August: it consisted of seven or eight individuals; one was shot and sent me on that date, and the day following another was killed further along the coast, and a third, probably of same flock, about the same time near Halesworth.—*T. E. Gunn; Sept.*, 1869.

Black Swan on the Suffolk Coast.—On the 31st of August a beautiful specimen of the black swan was shot whilst swimming in the sea off Corton Cliff, near Lowestoft. It was forwarded me for preservation: it proved to be a female and in good order; the plumage in excellent condition, without the slightest traces of an escaped bird: if it was so, it had been at liberty some time. The gizzard contained a quantity of sand only.—*T. E. Gunn; Regent Street, Norwich, September* 8, 1869.

[There is no doubt that this, like others that have been killed at large, was an escaped bird: but the facility with which the species breeds renders it very likely that it should become naturalized on the Danube, where it is comparatively unmolested, and where it has been repeatedly noticed by travellers: in England it can never become a denizen.—*E. N.*]

Scoter breeding in Strathmore.—It may be interesting to some of the readers of the 'Zoologist' to hear of the breeding of the scoter (*Oidemia nigra*) in Britain. When in Caithness last year I saw three pairs of the birds, on the 1st of June, in Strathmore, and next day was fortunate enough to obtain a single egg. A gentleman residing in the neighbourhood, to whose kindness I am this year indebted for the female and three eggs, assured me that they bred regularly in that locality.—*J. Watson.*

Little Auk at Loughton.—I have a fine specimen of the roche, or small black and white diver, now in my possession: it was shot by a friend of mine at Loughton. I think it a very unusual place for such a bird so far inland: I believe it to be a bird of true oceanic habits, it being so entirely a sea-bird that it is only seen on land or in the vicinity of the coast during the breeding season.—*J. A. Clark;* 11, *Duncan Place, London Fields, April* 23, 1869.

Sooty Tern at Wallingford.—An adult sooty tern (*Sterna fuliginosa*) was shot on the river at Wallingford, Berks, on the 21st inst., by Mr. Franklyn, and has been sent to Mr. Gardner, of High Holborn, for preservation. The rarity of this tern in Europe may be estimated from the fact that, up to the present time, it has been noticed but once in England and once in Germany. Mr. Yarrell has included the species in the third edition of his 'British Birds,' recording the capture of a single individual at Tutbury, near Burton-on-Trent, in October, 1852. Since that date, a second, killed at Proedal, near Magdeburg, was noticed by Naumann, in his 'Birds of Germany.' The sooty tern, however, has a wide geographical range, although so little known in Europe. Its chief stronghold would seem to be in the West India Islands, from whence it extends northwards into Florida and Georgia. Mr. Dresser observed it at Galveston, in Southern Texas ('Ibis,' 1866, p. 44); and it has been found on Christmas Island. Southwards and westwards it ranges as far as Ascension Island, and is said to be common in the islands of the South Sea. On Ascension Island, the sooty tern nests regularly in great numbers, and an interesting account of this breeding station, from the pen of Lieut. Sperling, will be found in the 'Ibis' for 1866, p. 286. The bird is there known to the sailors as the "wide-awake" tern; and under this name it is mentioned by Dr. Collingwood in his 'Rambles of a Naturalist on the Shores and Waters of the China Seas' (1868). The sooty tern differs so much in appearance from all the other terns with which we are familiar in England, that an ornithologist could not fail to detect it amongst a host of others on the wing. It is intermediate in size between the common tern (*Sterna Hirundo*) and the Sandwich tern (*S. cantiaca*). The bill, legs and toes are black; the head, nape,

and all the upper surface of the body, sooty black; the chin, breast and under parts pure white; while the tail is long and considerably forked. I examined the bird in the flesh. Mr. Franklyn may well be congratulated as the fortunate possessor of one of the rarest of so-called British birds.—*J. Edmund Harting.*

Black Tern's Egg in Norfolk.—On the 20th of April last an egg of the black tern was found on a marsh near Yarmouth; it was in the yelk and quite fresh, being probably dropped by chance.—*T. E. Gunn.*

Pomerine Skua at Aldeburgh.—On Wednesday, the 1st instant, I observed from the beach a small dark gull, curiously striped under the wings. Later in the day a similar bird was shot and taken to Mr. Hele of this place: it proved to be an immature specimen of the pomerine skua; length about 14 inches; colour dark brown, mottled and splashed with a deeper tint; the quill-feathers were black, edged with pale fawn-colour; tail black; under the wings were wavy bands of brown on an almost white ground, giving the curious effect described above. The two central tail feathers, so prominent in a mature specimen, only projected about half an inch.—*H. M. Wallis; Brudenell Terrace, Aldeburgh.*

Fulmar Petrel at Saltburn.—On the 19th of June I found a dead fulmar at Saltburn, washed up by the tide. This petrel is usually reckoned a rare winter visitor, and I cannot find that one has been obtained in England in June before.—*J. H. Gurney, jun.; Bank, Darlington.*

Varieties of Birds' Nests in one Garden.—It may interest some of the readers of the 'Field' and lovers of natural history to learn that the following nests are in a garden in this parish, within a radius of thirty yards, excepting the robin's and golden crested wren's nests, which are situated thirty yards outside:—nuthatch, firetail, blue titmouse (in three separate holes in the same red cedar), long-tailed titmouse, cole titmouse, tree creeper, flycatcher, moorhen, thrush, blackbird, missel thrush, green linnet, brown linnet, wren, starling, sparrow, robin, golden-crested wren.—*Wm. Gage Blake; Nowton, Bury St. Edmunds (From the 'Field').*

Zootoca v. *Lacerta.*—I am not quite prepared to give up the generic distinctness of Zootoca, for, after all, the fact of the deposit of eggs in a very few cases may be easily accounted for without this concession. I should like to know the condition of the eggs when excluded, and the period of the escape of the young after the eggs were expelled. I believe that I have stated that the young of the viper are only hatched (if such an expression may be allowed) in the act of extrusion, and that this liberation happens from the soft condition of the egg-covering. I think this is the case in Zootoca, and that the instances of the eggs being deposited whole may be only due to the unusual toughness of the membrane being such that the pressure in the act of extrusion is not sufficient to break it. The distinction between the snake and the viper and that between Lacerta and Zootoca, *quoad* the deposit of the egg, is quite analogous. It is not at all improbable that further observation might afford instances of the viper expelling its young still covered with its membranes; but this, as in the case of Zootoca, is a very different thing from the comparatively tough covering of the egg in Coluber and Lacerta. The real distinction, after all, does not consist in the accident of the young being expelled still covered with the membrane, or the contrary, but that in

one case the young is matured before extrusion, and in the other not until sometime after. Whether the distinction is what is termed *generic* or not is of no consequence: this is in so many cases arbitrary, that it is not worth controversy. Mr. Moncreaff's interesting communication in the 'Zoologist' of the present month (S.S. 1836) strikingly confirms the view I have given above.—*Thomas Bell; The Wakes, Selborne, August* 2, 1869.

Toads devouring Bees.—I can confirm from my own observation, and unfortunately my experience too, the remarks of your correspondent on the apivorous habits of the toad. A large toad was found watching a bee-hive in my garden, and was seen taking one after another of the inmates, as the late arrivals came home: the marauder was removed to a distant part of the garden, but as evening returned he was again at his post: this was repeated with the same result, and at length he was taken to a place from whence he could not reach the garden without climbing the slightly overhanging wall of a ha-ha. My under gardener, an old and observant man, did not appear to consider this an unusual circumstance; but I have never seen it excepting on the occasion above mentioned. I once had an enormous toad from the Island of Guernsey which was so tame that he would sit in one hand and seize insects from the other.—*Thomas Bell.*

[With regard to the enormous toads so common in the Channel Islands, I should like to have the opinion of so distinguished a zoologist as Mr. Bell whether they are of the same species as our own. I was formerly abundantly supplied with this monster by my late friend William Christy, and later by M. Piquet; but the demand now exceeds the supply, and I shall be obliged to any friend visiting the Channel Islands if he will bring me half a dozen.—*E. N.*]

Fox Shark off the Slapton Sands.—I have to record the occurrence of the fox shark, or thrasher (*Carcharias vulpes*), a specimen of which was taken in a net by some fishermen, off the Slapton Sands, on the first of this month: it measures about twelve feet from tip of nose to extremity of tail; and the length of the tail was nearly half its whole length: its colour was dark blue, mottled with white over the belly.—*Henry Nicholls; Kingsbride, Devon, Sept.* 13, 1869.

Nematus-Gall on Rhododendron hirsutum.—In the September number of the 'Zoologist,' (S.S. 1838), I called attention to the occurrence of the gall of a saw-fly on Rhododendron ferrugineum, in the Ursern Valley. I have now to record that this same gall also occurs on Rhododendron hirsutum, in the Bernese Alps, whence specimens collected by Herr Bischoff-Ebinger of Basle, on the Gemmenalphorn, near Interlaken, at an altitude of about 6000 feet, have just reached me; but, I am sorry to say, in a condition which precludes the possibility of rearing the insect. However, this production, being now signalled as occurring in two localities on different species of the so-called "Alpine Rose," is likely to be found all over the Alpine Range; and I hope that entomological tourists will bear in mind that the perfect insect is unknown to us.—*Albert Müller; South Norwood, S.E., Sept.* 6, 1869.

Snake Poison, and reputed Antidotes for the same.

By CHARLES HORNE, Esq., B.C.S., F.Z.S.

I cannot forbear quoting in this place from a very interesting book ('Thirty-three years in Tasmania and Victoria,' by G. T. Lloyd) a story strongly resembling in its details many of those detailed in the previous paper: he is speaking of the diamond adder:—

"During my long sojourn in the colonies I must have destroyed at least a thousand of those treacherous enemies of man. I was always under the conviction that the diamond adder possessed animal magnetism, and had the power of fascination to a degree beyond any other of its species. Often have I seen a terror-stricken little bird hopping from twig to twig, uttering the most plaintive cries and twittering its nervous wings in trembling agony, caused, as I have invariably discovered, by the overpowering attractive gaze of a diamond adder. In this opinion I was one day most unmistakably confirmed; for, whilst passing through the locality referred to, for the purpose of hunting the diminutive animal erroneously termed the kangaroo-rat my favourite highly-trained lurcher, Pat, hearing the well-known alarm-call of the ever-watchful mina birds, immediately ran to the spot where they were assembled; curiosity induced me also to hasten to the place. On arriving, I perceived from certain twitchings of Pat's sensitive foot and nose, whenever she touched any doubtful substance in the long grass, that the subtle enemy—the deadly snake—was somewhere in the vicinity, and had been espied by the little bush police birds (as the minas are termed), and of whom there must have been at least six or seven hundred, screaming at the top of their voices and uttering cries of distress from the branches of an adjacent tree. In vain did Pat and I search every clump of grass, dead bush, and log around us; nothing could be found. At length, however, after quietly watching at a little distance for about ten minutes from a small hole in the branch of a hollow gum tree, forth peered the grim visage of a very large diamond adder. Pat's keen eyes discovered the hideous monster first, and rushing towards me in undisguised terror, with bristling hair, and standing erect on her hind legs, she showed me the serpent—which had artfully crept up the inside of a tree, the heart of which had been destroyed by bush-fires. Being some thirty feet below I was compelled to be a mere spectator, and seeing that the cunning snake was somewhat shy of acting his part before so

unwelcome an audience as myself and my intelligent dog Pat, we concealed ourselves behind a clump of thick bushy wattles. Upon our retiring the serpent regained confidence, and, instantly creeping from his dark hiding-place, proceeded to entwine himself around a small branch of the tree; whereon firmly fixing himself, he uncoiled the upper half of his scaly pliant body, and commenced a series of the most graceful movements imaginable. The poor infatuated minas continued to scream, moan, and flutter round their insidious adversary, gradually drawing nearer and nearer, perching themselves within twelve or fifteen inches of him, with outstanding feathers and piteous cries; and panting as if at the last stage of life, they yielded one after another to the tender mercies and elastic swallow of the horrid reptile, which devoured them feathers and all until he could absolutely hold no more; but not the least exciting part of the scene was yet to come; for the wily mesmerist, though he could devise means to destroy other created things, had not the foresight to provide against the possibility of his own destruction: he had satisfied his appetite—had revelled in the death-pangs of his poor victims, but, cunning as he was, he proved his deficiency in military tactics. Wise generals always see their way clear for a safe retreat before proceeding on an enterprise: not so this outwitted adder; he had luxuriated to such a degree upon innocent minas that, when desirous of returning to his strong-hold, the small aperture through which he had so cleverly squeezed his yielding body, not being of the same elastic composition as his own, refused re-admittance to his now bloated and overgorged frame. After repeated trials, however, he became aware of his dilemma, and commenced his descent by entwining his nether extremity round the lowermost branches and twigs successively, until he had reached the last; then, swinging head downwards, apparently in a very undecided mood as to the propriety of casting himself to the hard ground underneath, he waved about for several minutes. In the meantime I had rapidly cut three or four good waddies (native throwing-sticks), and forthwith commenced a sharp fusillade at the vibrating foe. One lucky hit brought him down by a run, and in the next minute the flock of bereaved minas were deeply avenged."

Talking of antidotes for snake bites, and before giving the results of the experiments by Dr. Shortt (which experiments, I believe, are still going on), I may quote a letter which appeared anent the subject in the 'Pioneer' newspaper at Allahabad, in January, 1868:—

"Sir,—That there are more things in heaven and earth than are

dreamed of in the philosophy of the 'Pioneer's' editorial 'We' is very evident from the introductory remarks to the article anent Tobacco and Snake Bites, in the issue of this morning. It is very possible that priests—even in Bolivia—may appropriate and smoke (or even chew!) more divine and sometimes less fragrant matter than the noted weed of the Yuracare Indians; but this does not in any way detract from the gravity of the statement put forward by M. J. Rambossa, in his 'Histoire des Plantes,' as the following facts may tend to prove:—In 1854 there was an old Mussulman snake-charmer at Cawnpore, who invariably used the remains of his hookal chillum as a remedy for the bites of poisonous snakes. The "eldest son" or "medicine man" of many of the Kaffir tribes in Southern Africa, at the present day, uses the tobacco-oil and pipe-scrapings of the oldest "clay" in camp, as the "sovereignest thing on earth" for the bite of the puff-adder. A notice appeared in 'Land and Water,' at least six months ago, detailing the method of using this remedy as practiced by the said Kaffirs. I believe I am correct in saying that Dr. Shortt, Superintendent of Vaccination, Madras, who is now conducting some most interesting and careful experiments with poisonous snakes, is aware of the above facts, and we may in time hear of the result of his labours. To those of your readers who are interested in the natural history of snakes in general, and cobras in particular, I would suggest the following experiments:—Catch, or have caught for you, a healthy cobra; open his mouth, and place therein a good pinch of well-pounded tobacco, moisten this with a drop or two of water or spirit, and let the snake go. The effect of the tobacco upon the nervous system of the snake will become evident before he has crawled a dozen yards; and if the dose is strong enough, the snake will shortly die from its effects. Married men or nervous batchelors may employ the old grey-bearded faquier, who wanders about cantonments with a bangly-load of snakes and scorpions to conduct this experiment for them: he lives at Russoolpore, on the Jumna bank; and handles cobras, in the full possession of their faculties, with the sublimest art and most supreme indifference.—Yours truly, HAL."

The following accounts of the "cobra experiments" by Dr. Shortt, before alluded to, has been extracted from the 'Athenæum and Daily News,' Madras, March 15, 1867:—

"A correspondent of the 'Athenæum and Daily News,' of Madras, sends a further account of some cobra experiments. He says as

follows, in reply to the last paragraph of my letter of the 19th November last, which appeared in the 'Madras Times': — 'G. Vans Agnew, Esq., at present officiating collector at Tanjore, kindly sent me a snake-stone to test, and through one of my assistants I obtained from Mr. Garde, of the Conservator of Forest Department, a piece of wood reputed to be a specific for the bite of the cobra; and the late Dr. J. W. Sherman told me, a long time ago, that indigo was in great repute as a snake remedy, and was generally used in America as a cure for the bite of the rattlesnake: I accordingly procured some. To test these, I arranged and obtained from the country, through the assistance of kind friends, some six full-grown cobras, the largest of which was five feet, and the smallest four feet two inches in length: these reptiles were quite fresh and vigorous, and I numbered them severally one to six. I also got together several Pariah dogs and chickens, and at 12 noon on Monday the 11th inst., in the presence of H. Cornish, Esq., T. Pritchard, Esq., Dr. H. E. Busteed, and Mr. L. W. Lincoln (my assistant), besides one or two other gentlemen and natives, comprising my own servants and those of some of my neighbours, the following experiments were conducted:—

"1. Cobra Nos. 1 and 2 were made to fight; and I was more successful on this occasion, as the snakes, on being brought together and teazed, readily and of their own accord attacked each other by grasping with open mouths, and seizing each other mouth to mouth repeatedly, the wounds so inflicted drawing blood: they also bit one another in other parts.

"2. No. 2 cobra was now seized, and made to bite a chicken to observe effect; the chicken was dead in thirty seconds, whilst no harm was done to the cobras themselves. Both these snakes were then laid aside.

"No. 3 was next turned out, and was made to bite the leg of a full-grown powerful Pariah dog (A), and the snake-stone was immediately applied to the wound. At first there appeared some difficulty in getting the stone to adhere, but subsequently it held on; notwithstanding which, the dog was dead in two hours and ten minutes.

"4. The same cobra (No. 3) was made to bite immediately a white dog (B); and although the snake grasped the leg of the dog no distinct wound was perceptible, nor was there any effect noticed.

"5. No. 3 was now laid aside and cobra No. 4 was turned out, and made to bite a full-grown dog (C): the snake-stone was applied and fully adhered to the wound, and continued to do so till the dog died.

In twelve minutes convulsions set in, and the animal was dead in eighteen minutes.

"6. Dog D was now brought out: he was a large powerful animal, and the same snake (cobra No. 4) was made to bite him. This dog died six hours after.

"7. This cobra was set aside, and No. 5 was next turned out and made to bite a chicken; and, notwithstanding the assiduous application of the snake-stone, the chicken was dead in five minutes.

"8. A second chicken was bitten by the same snake, in which case the stem sent by Mr. Garde, being well ground, was applied to the wound, and some of it poured down its throat; notwithstanding which, the chicken was dead in forty-five minutes.

"9. This snake was now laid aside, and cobra No. 6 brought out and made to bite the leg of a third chicken. Immediately after the wound was well scarified and indigo freely applied to it, and some poured down its throat; notwithstanding which, the chicken died in four minutes.

"10. This snake was now made to bite a dog (E), and the stem was applied to the wound, and also given by the mouth. The dog was sick, and the wound greatly inflamed; but the animal died the next day, some thirty hours after.

"11. Snake No. 1 was now turned out and made to bite a dog (F), which died in five hours.

"I shall not trouble you here with a detail of the various symptoms which followed the bites of the snakes as exhibited by these several animals: those first bitten died rapidly, and the subsequent ones more slowly. From these experiments the remedies used seemed to be utterly worthless. No fairer trial could have been given to the snake-stone, to the application of which in every instance Dr. Busteed attended assiduously. I am not aware of the name of the stem sent by Mr. Garde; it looked like an ascleprade, and I should like to give it another trial ere deciding finally as to its antidotal properties. From the several experiments I have conducted I draw the following conclusions:—

"1st. For the bite of the cobra to prove effective, it is necessary that the said cobra should have the opportunity of seizing the part it wounds, so as to grasp or close its jaws thereon to enable it to inject the poison into the wounds.

"2nd. A simple wound sufficient to draw blood is frequently inflicted by the cobra striking at any animal, which it constantly does

by means of its sharp and curved fangs, without at the same time being in a position to inject its poison into the wound so inflicted; and I greatly fear that it is in wounds of this description that the much vaunted specifics are reputed to have proved successful.

"3rd. The poison very soon becomes exhausted by frequent biting.

"4th. There is no truth in the virtue attributed to the snake-stone, for it has neither the power to absorb or otherwise neutralize the poison from the wound.

"The snake-stone is simply tested by its porous nature, which the natives of India ascertain by placing the stone in water: the fluid entering the small interstices expels the air contained within them, and which is seen to rise to the surface in minute bubbles, when, if it does so, the stone is said to be *alive*, and is valued as a specific; but when not porous, and the air-bubbles are not seen to rise, it is condemned as worthless. Although there is much risk and danger, besides expense, attending these experiments, still, in the cause of science, I shall be glad to have opportunities of testing several specimens of snake-stones, and deciding finally on their merits; and I shall be glad to obtain snake-stones and other reputed drugs for trial. I shall feel greatly obliged to any one interested in the subject for snake-stones or remedies said to be effective, which I will carefully test and report results, and return the stones or drugs if necessary. The adhesion of the snake-stone to the wound is readily accounted for by the adhesive properties of the blood, and, as I have since tested it, the same thing occurring on its application to any wound."

This detail elicited the following letter:—

"*Scinde.—Snake-Bites.*—(To the Editor of the 'Sindian.')—Sir,—I have read with interest the account of a series of experiments, conducted by Dr. Shortt, of Madras, which appeared in the 'Sindian' of the 27th; and as he has expressed a wish to obtain any further information on the subject of these bites and their cure, with a promise to test any remedies which may be considered effective, I have the pleasure to draw his attention to the castor-oil plant, which is said to be (with what truth I have never had an opportunity of trying) an infallible cure. The following is the formula:—Take a wine-glass full of the juice of the leaves, mix a small quantity of water with it, and give it to drink: in the meanwhile the part bitten is to be well rubbed with bruised leaves in front of a fire. Should vomiting not take place in ten minutes, half the quantity should be again given.

The first dose is said to almost invariably cause vomiting, when a dark green substance is thrown up, followed by instant relief. I have already said that I have never tried this remedy myself, but my informant expresses himself so confidently as to the result, that I have determined to do so on the first opportunity which offers; and I am very glad now in being able to draw the attention of one to the subject who will doubtless give it a fair trial. It must, however, be remembered that there are substances which will produce violent effects on animals but not on man, and *vice versâ*. For instance, the Areca (betel nut), pounded and boiled in milk, acts violently, and will expel worms from a dog, but it has not the slightest effect on man.

"With regard to the experiments and conclusions drawn by Dr. Shortt, I beg to offer a few remarks.

"1st. *For the bite of the cobra to prove effective, &c.*—Those natives who pretend to a knowledge of small bites and their cures go further than the doctor, and insist that no bite can be fatal unless the reptile turns upon its back in the act of inflicting the wound; in fact, whilst the jaws are closed on the part grasped. There is some superstitious idea attached to this movement on the part of the snake, but, setting that apart as absurd, the fact itself is quite possible for such a wound to be more rapidly fatal than a mere bite. In the spasmodic endeavour to relieve its fangs, the higher the wound the greater the effort; consequently the body is twisted round, and therefore the bags which contain the venom, and which are placed at the root of the fangs, are more forcibly pressed on, and thus a larger quantity is ejected into the orifices.

"These remarks include conclusion the 2nd; and I fully agree with Dr. Shortt that it is this class of partially inflicted wounds only which have been successfully treated by the application of snake-stones, indigo, &c., and which are not *bonâ fide* poisoned wounds.

"3rd. *The poison very soon becomes exhausted by frequent biting.*—There is no doubt but that this is the case. A dog bitten by a snake in a state of freedom will, as I have seen it, die in a few minutes, *i. e.*, from ten to twenty. The snakes with which the experiments were made by Dr. Shortt were brought from a distance, and if brought in together had every opportunity of fighting with each other, and thus expending their venom. But even were this not the case, and they had been kept separate, in securing them they most likely bit at anything within their reach; and if the substance were soft, such as cloth,

the poison could have been ejected as easily as into a wound on man or beast. The best and most readily procured vessel wherein to keep a snake is a common earthen chutty, against the smooth sides of which they may dart their fangs, but without the poison being ejected and thus lost.

"4th. *There is no truth in the virtue attributed to the snake-stone.* —I fully concur in this opinion: I have seen numbers of these stones of every shade and colour, but have never heard of a cure being effected by the use of them; and I have heard the same thing from the mouth of a person competent to give an unbiassed opinion. When a cure is said to have been effected by these means, the patient and the operator are confederates and the snake a tame one, with, as a matter of course, its fangs extracted.

"Much has been written on snake-bites and their cure, but I am afraid that we are not nearer any antidotes than those in vogue in the days of Russel and others, who have fully studied the subject. These remedies were, and are, free excision of the part, the application of caustics, and the use of ammonia internally in any shape—Eau de Lua being perhaps the most convenient form. May not, however, the rapid death that occurs in some cases be attributed to the fangs having pierced a vein or artery, and thus have caused a quicker circulation of the venom through the system? I have heard of persons dying within half an hour of being bitten, and seen one who, being bitten at a distance of some five miles, yet walked in with assistance and died in the course of six or seven hours afterwards. The man was a snake-charmer, and had caught the animal two or three days before it bit him: he was confident that he would recover, having taken some nostrum of his own—with what result I have shown. The snake which caused this death was not of the usual colour of the Sind cobras, which are of a dull leaden hue: this one was light-coloured, approaching to yellow. The last I saw of the reptile was in a bottle, snugly stowed away in white liquor in the Kurrachee Museum, where it may be to this day."—X.

I will conclude this appendix with an account of some cases of treatment of snake-bite with ammonia, and Dr. Fayrer's exposure of some Indian remedies. The former bears date January 4th, 1869, and the latter February, 1869; together with Col. Shaver's experiments, which led to the latter.

"The value of Professor Halford's discovery for the treatment of snake-bite is every day becoming more apparent. To the case of Mr. John Brown, station-master at Elsternwick, alluded to in last month's summary, and who has since completely recovered from the effects of a bite inflicted by a large brown snake, there have been added many others. About a fortnight since a man named Philip Edwards, employed at Carngham, received a bite in the leg from a snake said to be five feet in length. The wound was immediately scarified and sucked. Dr. O'Grady having been sent for arrived soon afterwards, and proceeded to apply Professor Halford's remedy: the wound was allowed to breed freely, being at the same time bathed with *aqua ammoniæ:* a vein in the right arm was then opened, and a mixture of ammonia and water—one drachm of the former to two drachms and a half of the latter—injected; while small draughts of ammoniacal brandy-and-water were administered at intervals of half an hour: the patient was also kept walking, until from sheer fatigue he was incapable of further exertion. This treatment having been continued for four hours, the services of a galvanic battery were had recourse to, and a moderate current of electricity conveyed through the system: after two hours symptoms of returning animation were apparent, and in a short time the patient was able to walk about the room. A fit of stupor subsequently succeeded; but this passed off in a short time, and, at its termination, perfect consciousness ensued, and the man was so far recovered as to be pronounced out of danger. This treatment was found equally efficacious in another and very singular case, which occurred about a week ago: it was that of a young girl named Isabella Melross, residing at Smythes-dale, who, while drawing water from a hole, had been bitten by a carpet-snake in the extremity of the little finger of the right hand. Dr. Barnett was called in and applied ammonia, somewhat similarly to the method pursued as above stated. The case was dangerous, owing, no doubt, to the tender age of the patient; but she was enabled to walk about the following day, the effect of the poison having been completely overcome. On the following day the same girl was again bitten by a snake of the same species: her mother at once acted as previously, by excising the wound, applying ammonia, and putting on a ligature. Dr. Barnett's services were called into requisition on this occasion also, and, despite the weakness of the patient and the aggravated effects of the second bite, he was enabled to restore the girl to consciousness and strength after a short time."

The above accounts are very vague, and the patients appear to have been walked about for many hours, which after all appears to be the most important point in such cases, although ammonia has been known for many years past as a valuable means for maintaining circulation when feeble.

"*Antidote for Snake-Poison, by Col. C. L. Shavers.*—A report being made to me that a woman living in a village adjoining the Residency had been bitten by a snake, and was dying, I sent for the Residency surgeon, and walked over myself at once, attended by a servant with brandy, in the hope of being able to afford assistance. On arriving at the scene of the accident, I found the woman seated on the ground outside the door of her hut, under a sort of improvised porch formed of branches and leaves, which the villagers had erected at the moment to afford the woman air, without exposure to the sun. She was suffering from a succession of swooning fits, having already had eight previously to my arrival, in the interval of about two hours since she was bitten. The marks of the bite were distinctly visible on her ankle. While waiting for the surgeon one of the swooning fits recurred: the method resorted to by two men who were treating her was what is known amongst natives by the term "Jharna phookna," or to exercise. I had never witnessed it before; it was a strange and painful spectacle. As soon as indications of the approaching swoon appeared, and the woman fell forward from her sitting position insensible, one of the two men seized her head across the forehead and temples with one hand, the other hand supporting the head behind, and then commenced shouting some 'muntras,' or charmed verses, into her ear, at the very top of his voice; the other man, seated on the other side, taking up the last note of each cadence, and prolonging it with an indescribable howl with his mouth close to her ear. After this had been continued for some minutes without any sign of returning consciousness, the man who was supporting the woman by the head commenced shaking her violently and slapping and raising her, vociferously, in apparent anger at her obstinacy: after some time this had the desired effect, as slowly, with convulsive gasps and other symptoms of distress, she came to herself. In the interval a man had arrived on the scene, who at once assumed—and was tacitly allowed by the bystanders to do so—the treatment of the case. He quietly put aside the charmers, reassured the woman and her relatives, with an air of perfect confidence as to the safety of her life, and pounding

something on a stone he administered it to her. We then left, directing that a report of the progress of the woman's case should be made from time to time. In about two hours another swooning fit was reported—the previous ones having recurred at intervals of about a quarter of an hour. Subsequent reports announced her steady progress and complete recovery. That night she was kept forcibly awake, by the instructions of the man who had administered the antidote, as a precaution on account of the long time she had been under the influence of the snake-poison before he was called in.

"This case led me to make inquiries about the person who had treated it so successfully, and I sent for him: on questioning him as to the nature of the antidote he was very reserved at first, but, on my offering to take him into my service, he grew more communicative. He subsequently entered my service, and revealed to me the secret of his antidote, giving me some of his material. So confident was he in its efficacy, that he offered to allow himself to be bitten by any snake; but this was a test that it hardly required the fatal example of Mr. Drummond's case at Melbourne to place out of the question. To test the efficacy of the antidote, however, by experiments 'in corpore vili,' I sought the co-operation of Dr. Macbeth, who, I was aware, took great interest in the subject, and hence a series of experiments which are recorded in the 'Indian Medical Gazette.'

"On Oct. 2nd, 1868, a resident of Old Gwalior, a carpenter, came to the Residency in much apparent distress, to say that his wife had been bitten by a snake, and had become insensible from the effects: hearing, he added, that there was a person in my employ who could administer relief, he had come to seek it. I sent my servant back with him; he administered the antidote to the woman, which, as he reported on his return in the evening, had brought her round. The following morning I sent to inquire how the woman was; and desired that, if quite recovered, her husband (the carpenter) and she should appear at my office: they duly came the same day. The marks of the bite were distinctly visible on the woman's finger; but she had quite recovered from the effects of the poison: I had the man's deposition taken by my office munshire.

C. HORNE.

3, Bernard Villas,
Upper Norwood.

(To be continued.)

NOTICES OF NEW BOOKS.

'*The Birds of Sherwood Forest; with Notes on their Habits, Nesting, Migration, &c.*' By J. W. STERLAND. 244 pp. Letterpress; four coloured Lithograph Plates. London: Lovell, Reeve & Co., Henrietta Street. 1869.

Why of Sherwood Forest? not only is there no bird peculiar to Sherwood Forest, but there is not a single species, so far as I am aware, at all connected by fact or by tradition with that once celebrated resort of freebooters. Then why of Sherwood Forest? I can conceive no other reason than that the author lives in its vicinity: perhaps a sufficient reason: I will not dispute it. Still I think that before complying with the "wish" of his numerous readers "for the separate publication" of these pages,—for they have previously appeared in the columns of that excellent newspaper the 'Field,'—and before he had introduced such copious notes on the habits, nesting, migrations, &c., of birds generally, he should at least have informed himself more fully of what had previously been done under these most interesting heads. It will be admitted that Pennant, Latham, Bewick, Montagu, Selby, Meyer, Hewitson, Yarrell and Gould are the authors who have built up our bird lore into a respectable and permanent edifice, and yet this volume contains evidence that Mr. Sterland is totally unacquainted with all these authors excepting Montagu, and with him only through Rennie's edition! the name of Yarrell does certainly occur once,—I think once only,—and then he is cited second-hand, *viâ* Macgillivray, thus:—"In Macgillivray's account of this species [the crossbill] he quotes Yarrell's description of a young one that was taken when only just able to fly, the mandibles of which were quite straight, the under just shutting into the upper." I believe Yarrell expresses no opinion on the subject: the passage to which Mr. Sterland objects was written by Mr. Long, of Farnham, and is only quoted by Mr. Yarrell.

I will venture a second criticism. I entertain a decided opinion that no bird should be introduced into a local fauna unless the evidence of its presence was clear and decisive. Now a large number of Mr. Sterland's Birds are introduced on evidence that I cannot help regarding as unsatisfactory: let me give the first as a specimen.

The Golden Eagle at Sherwood.—"The lake was frozen over at the time, except in one place, where a flush of warm water entered from a

culvert which drained the abbey. The place was covered with ducks, teal and wigeon; and I first saw his majesty [the golden eagle] swoop down once or twice to get one for his breakfast, but unsuccessfully, as the ducks saved themselves by diving or flying off. The park-keeper got two shots at him with ball on a tree, but missed him each time, and he gradually got wilder, so that he could never be approached again near enough for a shot."—*Mr. Tilling, of Welbeck, in a letter to the 'Field' of January 27th.*—p. 18.

The event is said to have taken place in 1838: the bird was not obtained: it appeared only to have been seen on the wing; and whether the species was ascertained by Mr. Tilling or the anonymous park-keeper is not stated, but it is scarcely credible that either could give more than the vaguest possible guess on the subject.

Again with the goshawk. "A single specimen was killed by one of the keepers near Rufford in 1848, being the only instance I have known of its occurrence."—p. 29. Whose keeper? Who named the bird? Where is the specimen preserved?

These observations and queries would apply with equal force in a number of other cases, but instead of dilating on them, which were an ungracious task, I will select from Mr. Sterland's volume those passages on habits and economy on which the author has bestowed such evident pains, and which I am sure, were he at my elbow, he would point out for quotation: all of them contain abundant internal evidence of the high estimation in which the author holds them.

The white owl hoots, but seldom screams: the tawny owl screeches, but rarely, if ever, hoots.—"With regard to the note of the white owl, I venture with diffidence to express an opinion which I am aware is contrary to that of most who have written of it; at the same time it is no theoretical fancy, but the result of close and continuous observation. It is generally stated that this species seldom hoots. Montagu boldly says, 'it is *never* known to hoot;' Macgillivray that 'it has no other note than a shriek;' and Mr. Waterton that 'the tawny owl is the only owl which hoots.' Similar assertions might so easily be multiplied that it seems almost like temerity to assert the contrary. A desire to elucidate the truth, however, compels me to do this, and I am glad to be supported by so high an authority as Sir W. Jardine, who, in a note to a late edition of 'White's Selborne,' says that the white owl does hoot, for he has shot it in the act—and more, that at night, when not alarmed, hooting is its general cry. This I can confirm most unhesitatingly, for I have heard it repeatedly and continuously do so; and, on the very account of the

alleged infrequency, have taken particular pains to verify the fact. I have been familiar with both species from boyhood, and have roamed through our forest at all times of the evening, and it was always the tawny owl which we designated as the 'screech owl,' while the well-known 'hoo-hoo-hoo-hooo' was almost invariably uttered by the white owl. I have watched both in various situations, and have often been startled in the woods by the unexpected shriek of the brown owl, while by blowing into my closed hand I have imitated a hoot with such exactness as to cause the white owl to approach me very closely. A pair of the latter frequented a small field opposite to my house in the village; and on moonlight nights I have repeatedly and distinctly watched them while uttering their hoot, even within a few yards of the house. The result of my own careful and repeated observations may be thus summed up—that the white owl hoots chiefly, but sometimes, though very seldom, screams; while the tawny owl screeches, and rarely, if ever, hoots."—p. 43.

Each species of Shrike nests near Lee.—Writing of shrikes Mr. Sterland refers to Rennie in these words:—"Rennie relates, in his 'Architecture of Birds,' that a friend of his expressing his doubts," as to shrikes impaling insects, "he undertook for his own satisfaction, as well as his friend's, to endeavour to ascertain the fact, and he soon found within five miles of Lee half a dozen nests of each species."

The Black Redstart builds in quickset hedges by the side of the road near Ollerton.—"Those of my readers who possess the spirit of a naturalist, can easily imagine the pleasure which arises from a first acquaintance with a rare species which they have only read of or seen in a museum. Such will sympathize with me in my delight and surprise when I first met with the black redstart (*S. tithys*), and found it not only a visitor but actually breeding with us: my first acquaintance with it was the discovery, on May 17th, 1854, of a nest in a thorn hedge by the side of the road leading from Ollerton to Edwinstowe. It was placed about four feet and a half from the ground, and was constructed of dry bents, intermingled with a little moss, and lined with hair. When I found it, it contained four eggs; had it remained undisturbed, I have no doubt they would have been increased to the usual number of six, as the female was on the nest: as it was, I appropriated them as a valuable addition to my collection. This, however, was not a solitary instance, for two years later, on May 13th, 1856, another nest was taken from the same hedge, near the place from which I had taken the previous one: it contained one egg,

which was brought by the finder to me. A third nest was taken the next day at Ollerton: it was placed inside of a cattle hovel, amongst the thorns with which the upright frame-work was interlaced, and was constructed of dry grass only, and lined, as were the others, with hair: the second nest had moss mixed with the grass, like the first."—p. 67.

The chaffinch builds on the top of posts when sawn off perfectly smooth, and fastens its nest there with saliva.—"I have sometimes been led to believe that, in addition to the weaving and felting, by which the wool and moss and other materials are wrought together, the chaffinch uses its saliva for the purpose of increasing the firmness of its work. I have seen some of their nests, which certainly appeared on removal to have been attached to the branches of trees by other means than the mere weaving of the materials around them. I was first impressed with this idea by finding a nest on the top of a post in my own garden: the post formed part of an open fence, on either side of which currant trees were placed; it was of split oak, and the top having been sawn off the surface was perfectly smooth, and nearly, though not quite, level. On this platform of six inches by four, without a splinter or projection of any kind to afford an attachment, I found in the middle of May a chaffinch's nest. It was such an exquisitely wrought specimen that I was tempted to remove it for my cabinet, and was astonished at the tenacity with which it adhered to the post. The body of the nest was formed of wool, and lined with reddish cow's hair and two or three feathers; on the outside the wool was incorporated with green moss, and studded all over with green and white lichens similar to those on the rails of the fence: these lichens were more numerous towards the base, forming a sort of lip, and adhering to the surface of the post, on which there were no lichens growing naturally: finding it cling so closely I used great caution in its removal, and am quite convinced that its adhesion was effected by means of some glutinous substance,—most probably, as I have said, the saliva of the bird itself."—p. 101.

The siskin is one of those agreeable little birds of which we only get a glance now and then under very adverse circumstances; they are occasionally "caught and caged and starved to death" by the London birdcatchers. One of the long cages used by these gentlemen on their Sunday excursions is a sad and sorry spectacle on a Monday morning. The survivors, with a restless anxiety to escape, are seen trampling on the dead and dying with a heedlessness that makes one's heart ache. To turn from such a scene to Mr. Sterland's description

of the species in a state of nature is a refreshing and soothing change: here it is:—

The Siskin.—"It was in the first week in January, 1848, that I saw a large flock of sixty or seventy, who were busily occupied in extracting the seeds from the berries of a group of alders in Rufford Park. I was riding near the trees when my attention was attracted by the birds rising from them: the action was a most singular one, for so simultaneous was the flight of the flock, and so exactly alike was the movement of each individual composing it, that it was just as if all were regulated by one will instead of many. In this compact phalanx they wheeled about for a few turns, uttering at the same time a shrill twitter, and again alighted on the trees and commenced feeding, suffering me to approach within half a dozen yards of them; and at this distance I watched them carefully with extreme pleasure. While engaged in picking the seeds from the alder berries, they clung in every imaginable or unimaginable position, exactly like the blue titmice, of which they strongly reminded me, and, like that species, hanging with the back downwards as often as otherwise. After observing them for some time, I roused them from their employment with a stone, being curious to witness again their beautiful evolutions, which were performed exactly as before: they did not seem at all alarmed at my interference, but again descended *en masse* and recommenced their occupation."—p. 118.

It is always with unmixed satisfaction that I read any plea for the bird against his ruthless destroyer, man. Taking an isolated case, and watching a well-to-do liberal-minded and generally humane man, seeing him load his gun morning after morning throughout the summer, and walking leisurely round his garden looking out for some little bird to kill, under the idea that it might steal a gooseberry or a currant, one really would be apt to think that he was exhibiting symptoms of incipient insanity; but in England this is so commonly the case that it passes, not only without any expression of disapprobation, but is considered "respectable" and "English"—two words that cover almost the whole of our transgressions.

Rooks.—"In some parts of the country the agriculturists are not so conversant with the habits of the rook, and I know that in one locality in an eastern county a large rookery was destroyed under the belief of the farmers that its inhabitants were hostile to their interests and consumed a large quantity of corn. But mark the result. Two years passed away, and the farmers congratulated themselves on being

rid of their winged foes, little thinking that they had other foes in their place whose approach was more difficult to detect. In the second year many fields of wheat suffered from wire-worm; but in the third their ravages had become so general throughout the district as to occasion serious alarm. Little could be done to suppress their numbers until the rooks were again thought of, and the evil was traced to its source. The rookery was permitted to be re-established by the return of many who had escaped the massacre, and who still cherished a partiality for their native trees, but who had hitherto been continually driven off: their rapidly increasing numbers soon reduced the insect pest, leading the farmers to acknowledge the error into which they had fallen, and henceforth to look upon the rook as a friend instead of an enemy."—p. 134.

The green woodpecker is an especial favourite of mine: as regards colour he is the most beautiful of British birds, and he is a faithful friend to the proprietor of forestry by his incessant efforts to alleviate the plague of carpenter caterpillars, and the mysterious jarring noise he makes during his researches with this object are too familiar to need description. Mr. Sterland has discovered another and very different sound which this bird produces; and has detected the exact manner in which the feat is performed. I will quote the passage.

The Green Woodpecker.—"I have remarked previously that nearly all the old oaks in the forest have suffered the loss of their tops by the agency of wind and lightning, aided by natural decay. Sometimes you may see the upper portion of one of these venerable trunks quite denuded of its bark, and riven with many fissures, though the tree is all the while in vigorous growth. On some of these I have often noticed the green woodpecker practise a singular feat. Placing its bill in one of the long cracks I have mentioned, it produces, by an exceedingly rapid vibratory motion, a loud crashing noise, as if the tree was violently rent from top to bottom. I have heard it when the sound was so loud and sudden that the woods rang again. For a long time I was at a loss to know how it was produced, but I one day witnessed the process, and have seen it several times since: it would effectually rouse up all the insects, for it seemed as if the tree quivered from top to bottom."—p. 144.

Mr. Sterland disposes of the Baldamus theory about cuckoo's eggs in what may be called a very jaunty manner. "I believe that what Dr. Baldamus supposed were cuckoo's eggs were only abnormally large ones of the birds in whose nests they were found, and this varia-

tion in size is well known to every oologist and every birdsnesting school-boy."—p. 154. Thus it will be observed that the very ground on which the theory stands is cut away; and yet no one ever took such pains to elucidate, explain and enforce the reception of a theory as poor Baldamus—it was with him a life-study. His vast collection of eggs had been repeatedly examined by the very men who ought to have detected the mistake, and they did not: in fact, he says "Many of these eggs, evidently so widely differing, have long been known as cuckoo's eggs to our great ornithologists and oologists, such as Naumann, Thienemann, Brehm, Gloger, Von Homeyer, Degland, &c." *Zool.* S.S. 1147. Thienemann, perhaps the highest authority of all, was completely taken in by them: he accepts them without hesitation as the eggs of the cuckoo, and says, at page 84 of his invaluable work, "So much do many of these resemble the eggs of the wagtail, the tree pipit, the field lark, and the great sedge warbler, that they can only be distinguished from them by the distinctive spots and the grain." No men ever gave such unremitting attention to a subject as these German naturalists to this question of the cuckoo; day after day, year after year, they devoted themselves to the inquiry. The return of the cuckoo in the spring was hailed with delight as the signal for renewed observation. But Mr. Sterland has other observations on the cuckoo, which I must extract.

The female Cuckoo cries, and "sucks little birds' eggs to make its voice clear."—"Some have supposed that the cry of the cuckoo is only uttered by the male bird, but this has been denied by many others; I disbelieve it myself, for I have positive proof that the note is uttered by both sexes, from having shot the female when thus engaged. I have met with undeniable proof of its egg-sucking propensities, for a friend of mine shot one in a garden a short distance from my own, his attention having been drawn to it by the well-known cry. As he went into the garden the bird rose from the foot of the hedge, and was immediately brought down; when he picked it up it was not quite dead, and, as he held it, it laid an egg in his hand, thus being another instance of the female uttering the cry. The bill of this bird was covered with yolk of egg, which was also spread over the feathers at the base. On proceeding to the spot from which it rose, the cause of this was at once seen; for there was the nest of a pied wagtail with all the eggs broken. It seemed as if the cuckoo had greedily plunged her bill amongst them, and thus smeared the yolk over the feathers of her face."—p. 157.

Arrival of the Cuckoo in February.—" The earliest arrival of the cuckoo I have noticed was on February 16th, 1849: the weather was particularly fine and sunny for the time of year, and the cry at that unusual season attracted the attention of a number of persons. It was heard for half an hour on that day, but not subsequently."—p. 158.

In closing the book, and I have read every word of it, I find myself compelled to retain the impression it first made on me—first impressions are generally the best—that the author had better read more and write less. I can readily imagine that he will promptly retaliate by saying that we have already abundance of author's copying from one another, and questionable statements repeated *ad nauseam;* that we want new and truthful observation; that the subject is not exhausted; and that, instead of a constant consultation with books, we should appeal directly to Nature and learn of her. This line of argument is irresistible, unanswerable; but is it all-sufficient? A man may possibly, also, imbibe from Nature truthful views of religion, but I would recommend him also to read his Bible and his Testament before he announced those views, and to read them with the deepest attention and with a determination to learn and to profit by them. Good books on all subjects teach the reader "how to observe." Original observations are invaluable if made and recorded in this knowledge. Now I confess to feeling insuperable doubts as to Mr. Sterland's decision on the hooting of owls; as to the shrikes (I admit this is copied) nesting at Lee; as to the black redstart nesting in hedges; as to the chaffinch building on the tops of posts and sticking the nest to the post with saliva; as to the female cuckoo crying "cuckoo," or sucking the eggs of little birds, or arriving amongst us in February. I think that had Mr. Sterland carefully read and deliberately considered all that has been written on these subjects, and then carried the hints and ideas thus acquired into the lanes and woods and forests, he would have scarcely written what he has; and in the particular case of the shrikes he would scarcely have copied what he has: I cannot but believe that he might readily convince himself that these matters are not exactly as he has stated them, and yet I do not for a moment doubt that he has written them in good faith.

EDWARD NEWMAN.

Snake-Poison, and reputed Antidotes for the same.

By CHARLES HORNE, Esq., B.C.S., F.Z.S.

(Continued from Zool. S. S. 1880).

The importance of the subject may be gathered from the fact recorded in the last Oude Administration Report, that 1,127 persons died from snake bites during the past year; and again, in the Central Provinces Administration Report, that 1,874 had died from the same cause during the three preceding years. These figures, referring to isolated districts of India, may afford some approximate idea of the mortality arising from this cause throughout India, and all other serpent-infested countries of the East.*

Experiments.—1. A full-grown cock was given to the kelaree (snake-man), who administered his antidote. The feathers having been plucked from one thigh, and partially off the breast, the bird was freely bitten more than once in our presence by a lively cobra over four feet long. The cock showed no symptoms of distress of any kind, and, after an hour, was let loose and ran about apparently uninjured: he did not, at any time subsequently, exhibit any symptoms of distress.

2. A rabbit would not have the antidote administered by the kelaree, whose hand it bit severely in the attempt to do so. The rabbit was then twice bitten by a cobra over four feet long, on each occasion giving vent to a painful cry: it was then let loose, the poison taking very rapid effect: the animal fell on one side, then sat up for a few seconds, after which it tumbled over; showed great distress, hurry and irregularity in its efforts to breath; heart's action became rapid, feeble and irregular; the pupils of both eyes were violently acted on by some foreign influence, ultimately became quite fixed, and, in 3½ minutes from the time of being bitten, the rabbit gave a convulsive shudder and was dead.

3. A full-grown pariah slut, seemingly in perfect health, was handed over to the kelaree, who administered his antidote in a piece of meat, which the slut swallowed in our presence at 8·39 A.M. She was then bitten on the inner side of the left thigh by a fresh cobra over four

* These figures must be taken with great caution; although undoubtedly many lives are lost, as murders, especially of women, are often returned as death from snake-bite.—*C. H.*

feet long, which closed its jaws upon the place, holding on for some seconds. Several other attempts were made to make the cobra bite again; but it is not certain whether a second bite was given or not. The slut was then tied up, and meat was offered to her about an hour afterwards, at the instance of the kelaree, which she refused. He subsequently gave this as a reason why he thought his antidote had not been quite powerful enough; but said confidently, that the remaining effects of the poison would pass off in a few hours. The slut showed no symptoms of distress or lethargy for two hours, after which she lay down and appeared drowsy. The kelaree then administered a second dose of his antidote, which in the course of an hour entirely dissipated all drowsiness and weakness. At 1 P.M., the slut having been for about an hour and a half lively and apparently well, was let loose and ran away to the neighbouring village to which she belonged.

4. Another dog, full grown, in good condition and apparent health, was bitten at 8 45′ 50″ A.M. by a cobra over four feet long, the snake closing its jaws upon the place. Strong symptoms of uneasiness after three minutes, with very hurried and spasmodic breathing; pupil of eye violently acted on; in about fifteen minutes action of the heart much enfeebled and very hurried; pupil of eye still more evidently under a foreign influence; very shortly after this the breathing became more hurried and the animal very restless; frothy saliva also began to flow freely; the kelaree asserted the dog would go mad. Shortly afterwards, on putting anything within reach of his mouth, he snapped spasmodically and laid hold of a rope, but more convulsively than with any object. The first effects seemed to be excitement and distress, followed by considerable lethargy; after which its muscular efforts appeared to be nervously spasmodic, excited by some foreign influence, and evidently not voluntary. The hinder extremities first appeared to lose power; action of the heart hurried, weak and intermittent; about this pertod the pupil of the eye became fixed, lower jaw powerless, tongue lolling out and of a bluish black colour; breathing distressed, hurried and spasmodic, with only partial expansion of the chest. Died easily, after one or two spasmodic gasps, at 9·29 A.M., that is, in forty minutes and ten seconds after being bitten. Just before death it showed a dislike to the presence of water.—'*Indian Medical Gazette.*'

PS. (by the compiler).—Experiments Nos 2 and 4 appear to have been quite unnecessary, as all know that animals die of cobra bites and the symptoms have often been described.

Before recording Dr. Fayrer's experiment, with reference to the above, I will here quote a very interesting paragraph from the 'Microscopical Journal,' by Mr. G. B. Holford, of Australia, as to the effect of snake-poison on the blood.

"The melancholy accident* which so lately happened with the cobra-di-capella induced me to make some experiments and observations upon the action of the reptiles' poison, and they have proved so eminently interesting that I am induced to send you an epitome of them.

"I have to state, that when a person is mortally bitten by a cobra-di-capella, molecules of living germinal matter are thrown into the blood and speedily grow into cells, and as rapidly multiply, so that in a few hours millions upon millions are produced, at the expense (as far as I can at present see) of the oxygen absorbed into the blood during inspiration; hence the gradual increase and ultimate extinction of combustion and chemical change in every other part of the body, followed by coldness, sleepiness, insensibility, slow breathing and death. The cells, which thus render in so short a time the blood unfit to support life, are circular, with a diameter on an average of $\frac{1}{1700}$ of an inch: they contain a nearly round nucleus of $\frac{1}{2500}$ of an inch in breadth, which, when further magnified, is seen to contain still more minute spherules of living germinal matter. In addition to this, the application of magenta reveals a minute nucleus spot at some part of the circumference of the cell: this, besides its size, distinguishes from the white pus or lymph corpuscle.

"Thus, then, it would seem that as the vegetable cell requires for its growth inorganic food and the liberation of oxygen, so the animal cell required for its growth organic food and the absorption of oxygen: its food is present in the blood, and it meets the oxygen in the lungs; thus the whole blood becomes disorganized, and nothing is found after death but dark fluid blood, the fluidity indicating its loss of fibrine, and the dark colour its want of oxygen, which it readily absorbs on exposure after death.

"Let it not be thought that microscopic particles are unable to produce such great and rapid changes. It is well known, and I have frequently timed it with my class, that a teaspoonful of human saliva will, when shaken with a little quantity of decoction of starch, convert

* Evidently alluding to Mr. Drummond's case of misplaced reliance on antidotes referred to in Col. Shavers' account.

the whole of the latter into sugar in less than one minute. If ptyaline, the active principle of saliva, exerts this power at most in a few minutes, then surely the active principal of the secretion of the serpent's poison-gland may exert an infinitely greater power in as many hours. It results, then, that a person dies slowly asphyxiated by deprivation of oxygen, in whatever other way the poison may also act, and, so far as the ordinary examination of the blood goes, the post mortem appearances are similar to those seen after drowning and suffocation. I have many reasons for believing that the materia morbi of cholera is a nearly allied animal poison. If so, may we not hope to know something definite of the poison of hydrophobia, small pox, scarlet fever, and indeed of all zymotic diseases?

"I will not take up your space further, as I intend to discuss the whole subject, which abounds with matter of the deepest importance to physiology and medicine, as critically as possible in my lectures at the University, which recommence next week, when I hope also to show the presence of the poison of our Australian snakes in the blood of bitten and inoculated animals, and to make some experiments on the possibility of saving life."

In estimating the value of the foregoing extremely interesting paper, it will be well to bear in mind the extreme susceptibility of the blood corpuscles to the action of oxygen when exposed to its influence in the air after removal from the vessels. The living germinal nuclei seen by Dr. Halford in the corpuscles of the snake-bitten animal after death may have been formed whilst the blood was being mounted as a microscopical object. This is the more likely in a hot country like Australia (Melbourne, I believe, was the spot where the experiments were made), and it is only in the last number of 'Scientific Opinion' that I observe an article showing that the nucleus, said to distinguish the blood corpuscle of Mammalia, is due only to delay in mounting blood as an object, and with care may be observed to form: hence my caution.

Shortly after this I find, in the 'British Medical Journal,' the following, showing that Professor Halford (Holford?) had been trying some experiments for saving life in cases of snake-bite:—

"We have received from Mr. Paget, of St. Bartholomew's Hospital, some details forwarded for publication by Professor Halford, of Melbourne, of three successful cases in which poisoning by the bite of venomous snakes has been treated by the injection of ammonia into

the veins. In the first case, a man named Brown was bitten severely at about 11 A.M. by a large poisonous brown snake. He sucked the wound, applied a ligature of string, and drank freely of brandy to relieve faintness. At noon he became powerless, and coma and vomiting followed; the pulse was feeble, and pupils sluggish. He was brought to the surgery of Mr. Arnold, who excised the wound, applied strong ammonia locally, and employed galvanism, with the occasional administration of stimulants. The patient, however, continued to sink. Professor Halford was sent for, and the man now seemed dying: the Professor then injected some ammonia by a fine syringe into the radial vein: the effects were marvellous. In a short time the patient became sensible, and answered questions, and continued with proper attention to progress favourably.

Dr. Dempster Beckworth reports a second case, also successful: a male adult was bitten at 8 A.M. by a black snake; he sucked the wound; it was subsequently scarified, and ammonia applied locally; but he fell into a stupor, and at mid-day could not be roused. "I therefore," says Dr. Dempster, "injected liq. ammon. fort. into the saphena vein, and also hypodermically. This affected him at once, and, after the second ejection, he woke up and became sensible; his pupils, which had before been very sluggish, acted well, and his pulse rose from 56 to 70. After this he progressed well, with the exception of violent vomiting for twelve hours: he is now (November 15th) convalescent, but very weak. I, of course, continued the stimulant treatment, but I certainly attribute the man's recovery to the injection of ammonia, of which I altogether injected about twelve minims."

Professor Halford mentions, with reference to this case, that the liq. ammon. fort. should be diluted before injection in such cases with two or three times its quantity of water, and of this mixture from twenty to thirty drops should be injected into one of the larger veins. The syringe, he adds, should be carefully introduced, so as to give the ammonia a fair chance: he disapproves of merely throwing the injection under the skin, and believes that after the injection of the ammonia there is no necessity for resorting to the use of stimulants.

A third case is reported in the 'Newcastle Chronicle,' New South Wales. It is that of a young woman, at Lake Macquarie, dangerously bitten by a moderately large brown snake: apprehending immediate danger she at once sucked the wound, cut out the snake-bitten part, and tied a ligature round the finger about half an inch above the wound, and another at the wrist. She then rode off as speedily as

possible to Newcastle for medical aid: on the way she was directed to Dr. Irwin, Lake Macquarie-road, whom she found at home. The doctor, seeing it was a bad case, immediately had recourse to Dr. Halford's remedy: he at first scarified the wound, and poured some ammonia into it: following up the Professor's directions he also opened a vein above the wrist, and with a syringe injected a quantity of ammonia into it; he then kept the patient in constant motion, notwithstanding which, however, at intervals, she appeared to be almost overcome with drowsiness, and at one time very nearly gave way to sleep. Dr. Irwin, with most commendable perseverance, then took the woman by the arm and walked her round the room till two o'clock in the morning, when she rallied, the drowsiness having left her. On Thursday she appeared to have quite recovered, and returned home.

It is usually understood that the bite of brown snakes is excessively dangerous: these results are of the highest interest, and are most promising. They will, of course, attract the immediate attention of our Indian readers, and we shall hope to receive early confirmatory reports of the efficacy of the ammonia injections, which should, of course, be carefully employed, and of no greater strength and quantity than that recommended.

I will now extract, from the 'Indian Medical Journal' for February, Dr. Fayrer's experiments, made in consequence of Col. Showers' communication already quoted:—

"Col. Showers having very kindly brought the man who administered the antidote to Calcutta, and expressed his wish that its effects should be tested, I accordingly, with the assistance of three gentlemen, proceed to make the following experiments, the kelaree (snake-man) having been allowed to make any preparation that he deemed necessary on the day preceding, and in the morning of the day on which the experiments were performed. It is right to note that he says, on the day of the experiments, that the antidote he has now with him is not the most potent one he knows, but that, owing to the absence of rain, he had not been able to procure it, as the drought had prevented the growth of the plants from which it is derived. He expressed his belief that the drug he had with him would prove sufficient to counteract the influence of snake-poison. Accordingly a pariah dog was made over to him, and he administered to it a small piece of whitish-looking root, pounded and put in a piece of meat; this the dog (which was a full-grown pariah) ate readily. The kelaree

next selected, from a basket of fresh cobras, a full-grown one of the spectacled variety, which was made to close its jaws three times in the dog's hind leg, just at the fold of the skin of the thigh, and in the thigh. The dog showed signs of pain when bitten, but had not evinced the least fear of the snake when it was brought near him: it was probably the first he had seen. The experiment was performed in the usual place, and as follows:—

Experiment, No. 1.—The antidote was given to the dog in a piece of meat at 11.55 A.M. of the 16th of January, 1869; at 11.59 the dog was bitten by a full-grown spectacled cobra of the variety known by the natives of Bengal as the "Gokurrah." The snake was made, by a snake-man occasionally employed by me, to close its jaws three times at the fold of the skin in the right thigh, and in the right thigh itself. We ascertained that the cobra had only one effective poison-fang, the other being broken; but with this he drew blood slightly.

"Noon. Dog licks the punctures; bitten leg weak; partially paralyzed.

"12.1 P.M. Dog lies down; shows indisposition to walk about.

"12.3. No pain apparently felt; is drowsy; refuses to be roused, and then walks about, but shows a tendency to lie down.

"12.5. Looks sleepy; roused, he walks; but soon lies down again.

"12.13. Breathing catching; is drowsy.

"12.17. Cannot walk without staggering; falls down when left alone; breathing hurried.

"12.20. Convulsed. The kelaree now applied some oil to the mouth and nostrils.

"12.21. Lies on the left side; universally convulsed; eyes glazed; pupils dilated, and insensible to light.

"12.22. Defecates; is pale and bloodless about the mouth and lips.

"12.23. Involuntary micturition.

"12.27. Respiration ceased.

"12.31. Dead.

"Ceased to breathe three minutes before the heart ceased to beat.

"Bitten at 11.59; died at 12.31; death in 32 minutes."

The above notes were taken by Dr. Ewart, who carefully watched and noted all the symptoms, and he adds the following remarks:—"There is evidence that death takes place through the nerve centres, the heart continuing to beat after the respiration entirely ceases,

which can only be through its own inherent irritability and its own ganglionic supply, and quite independent of the medulla, which, in other respects, is *hors de combat* from three to four minutes before the heart actually ceases to pulsate."

This experiment, though unsuccessful in demonstrating the good effects of the reputed antidote, cannot be considered as conclusive, as the man stated that it was not the most potent agent he was in the habit of using, nor, indeed, should I consider any single trial as proof either for or against the good effects of the drug, however it had resulted. Many and repeated experiments are necessary before any definite opinion can be formed on so important a subject, and, therefore, before recording one it is expedient that the experiments should be made again; and as Col. Showers has expressed a wish that the man should have further opportunity of exhibiting his antidote, I think that, on a future occasion, more certain results may be obtained.

Having studied the effects of the poison in many animals, and having formed conclusions as to the nature of the cause of death, I am sceptical on the subject of antidotes, and fear that the hopes of those who are most sanguine on the subject will not be realized. I am not the less anxious, though, to become acquainted with whatever may be of service in the treatment of snake-bites, whether prophylactic or therapeutic; and I shall be glad to record any facts that tend to throw light on the subject, as to admit the potency of an antidote when I see it proved. Col. Showers informs me that the kelaree makes the following objections to the experiment:—1st, that he was not fully prepared; 2ndly, that the antidote was not the most reliable one he knows of; 3rdly, that the animal was bitten three times by the cobra.

With reference to these I would remark, that the time for the experiment was appointed some days previously; that he was invited to make any previous preparation he thought desirable; that the room in which the experiments were performed was placed at his disposal, and that certain snakes were also made over to him; that he locked himself in for some time the day before making his preparations; and that Mr. Sceva was most careful to see that all he wanted was procured, and all his wishes carried out on the day of the experiment. The animal bitten was placed at his disposal to do what he liked with, and all his wishes were complied with to the minutest details. If, therefore, anything were wanting the fault was his own.

Secondly. With reference to the antidote itself, it was suggested by himself, and he certainly expressed his belief that it would prove efficacious; or else why did he administer it?

As to the number of times the dog was bitten by the cobra, the snake was made to close its jaws in three places to insure the injection of the poison; the first bite, at least, being doubtful. I am quite satisfied that one bite, had it been fairly inflicted, would have been sufficient: nor does the fact of there having been three punctures affect the question in this instance, for nothing occurred to show that the dog was in any way influenced by the so-called antidote: it succumbed with the same symptoms, and in about the same time, as other dogs that had not taken any antidote at all, and were bitten in the same way by a cobra.

The efficiency of the antidotes described by Col. Showers shall be fully tested whenever the man who administers them declares himself to be ready and fully prepared.

Experiment, No. 2.—At 12.13 P.M. a kid of about three or four months old was bitten three times in the hind leg by the same cobra that bit the dog in the previous experiment. The object was, that in the event of the poison not taking effect on the dog, the activity of the poison might be demonstrated by its action on the kid: this, had the dog survived, would have been so far confirmative of the efficacy of the antidote.

"12.15. Leg weak; partially paralyzed.

"12.16. Bleating; staggers, but walks; lies down; defacation.

"12.20. Can stand, but the bitten limb is paralyzed.

"12.25. Almost paralyzed; convulsed.

"12.29. Convulsed.

"12.34. Heart beats 96 per minute; respiration almost gone; eyes glazed; pupils dilated, insensible to light.

"12.36. Death. Heart beat for two minutes after respiration had ceased.

"Bitten at 12.13; dead at 12.36. Death in twenty-three minutes."

The activity of the poison had no doubt been exhausted by the previous biting of the dog, otherwise a young animal like the kid would have probably succumbed more rapidly.—'*Indian Medical Gazette' for February,* 1869.

Amongst the antidotes—or, at least, those reputed to be such—is the plant called by the natives in the N.W. Provinces, the nervissa (*Aristolachia Indica*). This plant grows as a creeper, and the patient is made to chew the leaves, from which also a decoction is made and administered: I grew the plant at Manipurì, and tried its efficacy, but without avail.

A friend of mine writes me that he grew it at Multan, and that a man, whom he made chew the leaves after having been bitten by a cobra, came round; but then, he added significantly, "he must admit he also gave him eau-de-luce;" and thus it is, it appears to me, in many of the cures the reputed antidotes have been supplemented by stimulant treatment and constant exercising of the patient, by which latter methods alone the man has been cured.

In order to show the English reader what snakes we commonly meet with in India, as also that the Government does its best to inform its dependents, I will here quote a list of the venomous snakes as found in the Punjab, from the 'Punjab Government Gazette.' I am not aware that any such list has been published in the three Presidencies: the matter has evidently been taken from Dr. Günther's work on the Indian Snakes:—

"The first mentioned belong to what are called Colubrine Snakes, having the general form and appearance of ordinary harmless snakes, as opposed to the vipers which form the other division. They are classed by Günther, in his catalogue of snakes in the British Museum, under the name of Elapidæ; have the venom fang grooved, with or without two or three teeth behind it, but never in front of it in the upper jaw; the head is not sensibly thicker than the neck, and is covered above with moderate-sized or large plates; the scales in general are smooth.

1. NAIA TRIPUDIANS—the cobra, figured by Russell in his 'Indian Serpents,' part 1, plates 5 and 6; *cobra-di-capella* (Portuguese), *i.e.*, the "hooded snake"; *nag* or *nag samp* (Sanscrit and Hindustani), in the south of India; *keoutia* (Bengali), also *gokhura*, *i.e.*, "cow hoof."

Several of the numerous varieties of this snake have received distinct native names, but it is not necessary to give these here. This snake is too well known to require any detailed description: the genus Naia comprises those snakes that, to the general character of the Elapidæ given above, adds that of a distensible neck, the cervical ribs

being lengthened, and the hood thus formed bears on its upper surface the well-known mark of a pair of spectacles, hence sometimes called the "spectacle snake." It varies very much in colour, some being pale brown, others dark brown, others nearly black, and some purplish brown. The snake-charmers give various names to these varieties, some of which, however, are quite local; and Mr. Lesson has also given a distinct specific name to one variety. The spectacle mark is in general most distinct in the pale-coloured varieties; less so in the black. The number of rows of scales on the body varies from nineteen to twenty-three; the large abdominal scutæ or shields from the chin to the vent from 180 to 190; and the subcaudal shields from the vent to the end of the tail, which are in a double row, from fifty to sixty—more or less. The celebrated asp of Egypt (Cleopatra's adder) is the only other known species of cobra.

2. BUNGARUS LINEATUS. The "karait," popularly of Europeans, figured by Russell, part 1, plate 1; said to be called *karait* and *kalla karetta* in some parts; *kulcha* of snake-men in Calcutta; also called *keoutia* by many; *tirkheca* at Sangor.

The genus Bungarus is similarly formed to the cobra; but the subcaudal plates, or those under the tail from the vent, are in a single row. The poison-fangs are not very large, and have a few smaller teeth behind them, but none in front. This species, which is perhaps the most common venomous snake throughout all India, is found equally in barren plains and well-wooded country: it attains the length of four feet or perhaps a trifle more occasionally, but is rarely met with so large. The head is barely thicker than the neck: there are fifteen rows of scales on the body; the abdominal shields from the chin to the vent are about two hundred, and there are forty or so single ones under the tail. The colour is a dull black with narrow white cross bands, very distinct when young but almost obliterated in old snakes; the belly is white.

There are one or two harmless snakes belonging to the genus Lycodon, very similar in colour to the karait and often mistaken for it: these can be readily distinguished by having two rows of shields under the tail, as well as by the presence in the harmless snakes of teeth in front of the upper jaw.

The next snake belongs to the viperidæ, or Viper family, distinguished by having only the fang (which is usually very long) in the upper jaw: this folds back when the mouth is shut, or the snake

quiescent; but can be raised at the will of the animal, and is perforated for the passage of venom. The head is large, flattened, and usually covered with small scales; the neck is thin, the body thick and massive, and the tail is short; the scales are usually ridged or keeled.

3. DABOIA ELEGANS. *Vipera Russellii*, Shaw. *Bora* and *chokera bora* (Bengali); *katroll* of some Calcutta snake-men; *khasa bora* of some; *dhiyur* (Hindusthani) in some parts; *coonj chari* at Sangor; *cobra monil* of the Portuguese. Figured by Russell, part 1, plate 7.

This viper is what every one would, at first sight, call an ugly-looking snake. The head is large and somewhat triangular, covered with small scales; the neck is a good deal thinner than the head or body, which last is thick and massive; the tail is short; its fangs are of great length. The colour of the adult is a dirty olive-brown, with a triple series of dark rings, the centre one on the median line of the bark joined together like the links of a chain; hence called cobra monil (Latin, *monile*) by the Portuguese. When young the colours are more vivid, the brown richer and more chestnut in tint, and the dark rings more distinct: it has twenty-nine to thirty-one rows of keeled scales on the body; the abdominal plates vary in number from 160 to 170, more or less; and those under the tail from fifty to sixty: it grows to the size of four and a half feet and upwards.

4. ECHIS GARMINA. Figured in Russell's "Indian Serpents," part 1, plate 2, and called *katrool* by the snake-men.

This is a second species of viper, very similar in form to the last; common in Madras, in Central India, and the North-West Provinces, but has not yet been found in Lower Bengal. It is a small snake, rarely exceeding eighteen or twenty inches, of a pale brown colour with some white rings: its abdominal shields number about one hundred and fifty, and its subcaudal about thirty, more or less. I have never heard of this venomous snake causing death to any one bitten, and I have known dogs to recover from its bite.

Experiments on the Influence of Snake-Poison—made by J. Fayrer, M.D., chiefly with reference to Professor Halford's remarks, based upon his experiments in Australia relative to the effect on the blood-corpuscle. This paper had not been seen by me when I wrote the note which is appended to Professor Halford's remarks, and which was suggested as there stated by a paper on the subject of blood-

corpuscle in 'Scientific Opinion.' The examination of objects under the microscope, as I know from experience, is not so easy as is generally imagined, and any delay in mounting so delicate an object as a blood-corpuscle is fatal to accuracy of observation. With these remarks I will quote the experiments of Dr. Fayrer, which were recorded in the 'Indian Medical Gazette' for December, 1868:—

"The following experiments are the latest that Dr. Fayrer has made in continuing his splendid series of researches on this important subject:—

"*Experiment, No.* 1.—15th October. A fish (Ophiocephalus marulius), about ten inches in length, was bitten by a fresh cobra at 11.20 A.M. in two places, on the dorsal and ventral surfaces. At 11.22 the fish turned over on its side in the water; at 11.23 struggling and plunging violently in the water; at 11.25 turned over on its side; at 11.26, on being roused, plunged violently; at 11.40 dead. Bitten at 11.20; died at 11.40. Dead in twenty minutes.

"*Experiment, No.* 2.—A large snail (Achatina fulica) was bitten at 11.28 by a cobra; it immediately withdrew itself within its shell. At 11.45, in order to examine its condition, the shell was broken; it still continued to contract. At 12 no contraction; all irritability seemed extinct. Dead.

"*Experiment, No.* 3.—Two snails of equal size, shells previously broken; one was bitten by a cobra at 12.28; it immediately shrank, aud contracted itself. The other snail was not bitten, and was kept for comparison. At 12.40 irritability of the bitten snail much diminished. The bitten snail seemed to lose its vitality mnch sooner than the uninjured one; but the precise time when irritability ceased was not noted. These were the only invertebrate animals I could procure on this occasion. The experiments, though not very satisfactory, leave no doubt that the mollusk was affected by the poison.

"*Experiment, No.* 4.—A fully-grown cobra was bitten at 11.40 A.M. in two places near the tail, by Daboia Russelli; at 11.48 no effect; 12.50 no effect. October 10th (20th?), 8 P.M., the snake was perhaps not so lively, but there was no marked effect, and it lived.

"*Experiment, No.* 5.—A fully-grown cobra was bitten in two places, on the ventral surface and the middle of the body, by a daboia, at 11.58. Up to 12.50 no effect; 16th October, 8 P.M., no effect; the snake lived.

"*Experiment, No.* 6.—A half-grown chicken was bitten by a fresh

cobra in the thigh at 12.2; at 12 3′ 45″ it crouched; head drooping, beak resting on the ground. At 12 4′ 30″ paralyzed, head lying on the ground; at 12.5 convulsed; at 12 5′ 10″ dead, *i. e.*, in three minutes and ten seconds.

"*Experiment, No.* 7.—A second chicken was bitten by the same cobra at 12 9′ 30″ on the thigh; at 12.10 leg partially paralyzed; at 12.13 lying down, beak resting on the ground; at 12 13′ 30″ paralyzed, beak resting on its point on the ground; at 12.14 convulsed. Dead in five minutes and thirty seconds.

"*Experiment, No.* 8.—A third chicken was bitten by the same cobra in the thigh at 12 17′ 30″; at 12 18′ 30″ it fell over, rested the point of its beak on the ground; at 12.19 convulsed; at 12.21 dead, in four and a half minutes. This chicken was rather smaller than the two preceding ones. These three experiments show that the snake had lost but little of its power in three efforts: the cobra used in these experiments was not fully grown, but it was very active and vicious.

"*Experiment, No.* 9.—The above small cobra was bitten at 12.35 in two places, in the middle of its body and on the ventral surface, by a large and fresh cobra. October 16th, 8 P.M., not affected; it lived.

"*Experiment, No.* 10.—October 19th, 11.40 A.M., a large dhamin (*Ptyas mucosus*) was bitten in two places by a daboia; at 11.47 is partially paralyzed; the mouth is wide open; appears unable to move; respiration continues; at 11.49 moving slowly about; at 11.52 appears to be recovering; at 12 more active. October 20th, 6 A.M., appears sluggish; at 10 A.M., on being roused, moves slowly, but is weak and stiff. Recovered subsequently. October 26th, 12 47′1″ bitten again by another daboia; at 1 P.M. no effect; became sluggish and died at 10.40 P.M. on October 27th."

On the 26th October a number of other experiments were made with the view of again carefully examining the blood-surface before and after the snake-bite: the blood was very carefully examined on three occasions:—1st, before the animal was bitten; 2nd, whilst it was under the influence of the poison; 3rd, after death. In no case was anything found to support Professor Halford's theory, or to confirm his observations. There was no appearance of any new corpuscle, nor was there any change of importance in the condition of either the red or white globules of the blood. My impressions were in favour of the theory advocated by Professor Halford, and if any bias existed it was certainly for, rather than against, the explanation he gives of the pathological changes in the blood. Nothing, however,

that I have seen, after many observations, supports the view in question; and I am constrained to believe that the change in the blood is of a much more subtle character than can be detected by the microscope. Moreover, in rapid death, as for example, when it occurs in from thirty to forty seconds, it is impossible that such developmental changes could have taken place. The cause of death is evidently an impression made on the nerve centres through the medium of the circulation; but it is, I think, evident also that it is one of a dynamical nature, and not immediately dependent on any structural changes that may, if any do, occur in the blood, and can be seen with the microscope. When death is protracted, and the venom has thus time to set up blood changes, as in the case of zymotic poisoning, I can well imagine that the blood, as such, becomes unfitted for the purposes of life, and that death results in consequence of these changes; but I have not as yet seen anything to confirm this view of the cause of death, nor do the post-mortem appearances show that it is due to asphyxia, from pulmonary congestion or embarrassment. I do not, however, positively assert that such is not the case; I merely record the fact that, up to the present time, I have been unable to discover the blood changes discovered by Professor Halford: further investigations may lead me to a different opinion.

Experiments on Snake-Poison, by Dr. Fayrer, M.D., Calcutta.—"I am indebted to Messrs. Greenhill and Rutherford, Veterinary-Surgeons, for the opportunity of making the following experiments:—

"The horses experimented on had been condemned to be destroyed for the disease, partial paraplegia ("gone in the loins"), and were placed at my disposal by the above gentlemen, for whose valuable aid in noticing the symptoms and recording the pathological conditions I am under much obligation. The disease, though incapacitating the animal for work, is not such as to reduce his strength so much as to vitiate the evidence derived from the effects upon him of the poison; and I believe these experiments may be accepted as fair illustrations of the action of snake-poison on the larger animals. The subjects experimented on were a stud bred mare about 14 hands 3 in. high, and aged twenty-seven years, suffering from partial paraplegia, and an Australian horse, 15 hands 1 in. high, nine years old, a powerful animal and in good condition, although also paraplegic. The mare succumbed in an hour and twenty minutes, from the effects of the bite of a large cobra, whilst the younger and stronger horse

survived the bite of a powerful, fresh and full-grown daboia nearly twelve hours.

"The difference in the effects of the poison of the daboia and cobra in these two cases is very remarkable, not only as to the duration of life in the animals bitten, but also in the pathological conditions before and after death. The mare bitten by the cobra was rapidly affected—staggered, became exhausted, and died in less than an hour and a half. The post-mortem examination showed distinct rigor mortis, firm coagulation of the blood; the heart and large vessels, aorta as well as venæ cavæ, distended by firm ante and post-mortem coagula. The lungs were very slightly congested, frothy when cut into, and on the anterior surface rather pale and bloodless than the reverse, whilst all the abdominal viscera were equally free from congestion. The horse bitten by the daboia, on the other hand, was affected very slowly, and seemed to doze his life away until just at the last, when a few unconscious plunges terminated his existence: the post-mortem examination in this case showed less cadaveric rigidity, fluid blood, empty cardiac cavities, and lungs and other viscera congested. But it is to be noted that the cobra bit more vigorously, forced his fangs deeper, and had to deal with a more feeble animal than the daboia, who bit a more powerful and healthy horse, and did not insert his teeth with such vigour as the cobra. The snakes were both fresh and fully grown, and their terrible power was strikingly illustrated by the death of these two horses.

"The difference observed in the pathological appearances and state of the blood after death may probably be accounted for by the greater rapidity of death in one case, rather than by any essential difference in the nature of the action of the poisons: the mare bitten by the cobra died in eighty minutes, and after death the blood coagulated firmly, and was found distending the heart and great vessels with firm coagula. Death was probably caused by the rapid effects of the poison on the nerve centres before the blood had time to be thoroughly devitalized. In the other case, where death did not occur for nearly twelve hours, there was no coagulation either in or out of the heart or vessels; sufficient time had elapsed to allow the blood to be thus thoroughly changed. I am inclined to believe that if death were protracted after a cobra bite, the condition of the blood would be as it was in the case of the daboia bite."—'*Indian Medical Gazette*' *for November*, 1868.

C. HORNE.

3, Bernard Villas, Upper Norwood.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 1841).

AUGUST AND SEPTEMBER, 1869.

Kingfisher.—Where do all the kingfishers, so plentiful at this season in the marshes, come from? This year they are abundant, and I have seen three on the wing together: there is no doubt we have considerable arrivals of these brilliant living gems during the last week in July to the first week in August inclusive: for years I have observed how numerous they become about this time, and since few breed in this district—none, as I am aware, in the marsh—this large increase during the latter summer must be consequent on arrivals from the northern countries on the Continent; if the latter, they are—excepting, perhaps, the whimbrel—the first migrants to arrive on our shores, the advanced guard of the great bird army. But where do they come from? This species, according to Mr. Wheelwright, has never been detected breeding in Scandinavia, and is but sparingly dispersed over Denmark; consequently, if continental birds, the migration must be due from the coast of Holland, and they would thus naturally arrive on our eastern coast. I scarcely think they are wanderers from our more northern counties, as the sudden disappearance of the broods from their summer haunts could not fail ere this to have been noticed and recorded. A few, very few, of these arrivals remain for the winter, the greater part leaving before autumn floods and storms.

Brownheaded Gull.—August 23. I have more than once remarked, in former volumes of the 'Zoologist,' on the habit these gulls have of hawking for the crane-fly. I had again, this afternoon, the pleasure of seeing my favourite gulls capturing insects on the wing, hovering with a curious see-saw motion over one of the marsh pastures. I took some pains to estimate the number of gulls that were at work over this field (50 acres), and by counting, as near as was possible, the birds over one section of the pasture, judged that there were altogether certainly not less than six hundred. It was not this time, however, the crane-fly they were pursuing, but winged swarms of black ants, infinite myriads of which filled the air. I have seen nothing like it before, and feel how utterly hopeless it is to give any correct idea of their number—sometimes they had the appearance of a gray mist, or scud, drifting across the marsh: it was as if all the ants in the

country had followed the prevailing fashion and gone to the sea-side. My clothes were soon covered, and hundreds became entangled in the mane of my horse: these were of two sizes, from that of the common ant to others four times the bulk (probably the females); all were very dark brown or black, with the extremity of the abdomen a shade lighter.

Lapwing.—August 25. We have now some considerable flocks in the marsh: their principal rendezvous is at present the turnip fields; they also went at low water to the mud-flats. This is, however, an unusual circumstance, and I never knew them do so unless in a lengthened period of hot dry weather.

Whimbrel.—August 25. The heat to-day was excessive; the very cattle were oppressed by it, and there was not a breath of wind to temper the fiery glow. Several times during the day I heard far up —very far up—in the cool thin atmosphere the familiar call of whimbrel, but only once distinguished the passing flock: they were mere specks, a string of about thirty flying *en échelon.* Whimbrel have now passed over this village, going southward, more or less frequently since the middle of July: they usually fly at an immense height.

Rook (variety).—There is a curiously marked rook in this neighbourhood: the peculiarity is in the wings: in each there is a single white secondary quill, the remainder of the plumage being of the ordinary colour.

Wild Duck (A. boschas, variety).—A wild duck (female), which I shot this morning, Sept. 1st, in the marshes, differs from the ordinary type in having the general plumage some shades darker: on the lower neck and a portion of the breast there is, in singular contrast to the rest of the plumage, a very perfectly formed crescent-shaped patch of a pure white: the concave side is uppermost, the horns running up to a point on each side of the neck. I have seen some of the "foreign" ducks, mentioned in the 'Zoologist' (S.S. 1737), marked exactly in the same manner.

Knot.—September 8. Shot two out of a small flock on the flats this afternoon. I had no difficulty in getting within easy range. Neither of my specimens is in the complete winter dress: the under parts in both are dashed with a pale reddish buff, more conspicuously on the flanks and chest.

Redshank.—September 10. First arrival; five seen on the mud-flats.

Gray Plover.—September 10. Heard calling on the flats.

Swift.—September 18. Last appearance; a single bird seen.

Thrush.—September 20.—Thrushes are now plentiful in our turnip fields, and keep rising before the dogs, to the no small annoyance of nervous sportsmen.

Lesser Blackbacked Gull.—This species is now common on the flats: it is not with us a resident species, and is seldom seen except during the autumn. Before rain or wind these gulls are very noisy, and tower, flying round and round in circles, much after the manner of the brown head. Their cry is extremely hoarse, somewhat resembling that of the wild goose, but is not nearly so musical.

Starling.—There are some old ash trees in one of my hedgerows thickly covered with gray lichens. I observed a flock of starlings this morning flying about them and settling on the trunks and larger limbs, clinging to the rough bark like so many woodpeckers: there was a good deal of lichen scattered on the ground, and on examining these trees I found beneath their gray covering a small white grub, not unlike a cheese-maggot, but larger. There are also many long-legged spiders in the interstices of the bark.

Hybrid Wild Duck.—September 23. I killed a dark-looking duck from the beck this morning, which I cannot identify: I think it probably either a hybrid between the common A. boschas and the American dusky duck, A. obscura; or between the common wild species and one of the foreign birds previously alluded to—some of which I have good reason for thinking have gone wild in this district. The following description was taken the same evening:—

Male.—Length over all $23\frac{1}{2}$ inches.
„ of bill $2\frac{1}{4}$ „ from angle of forehead along ridge.
„ of tarsus $1\frac{17}{20}$ inch.
„ of wing from flexure, $11\frac{1}{4}$ inches.
Expanse of wings, $33\frac{1}{2}$ inches.
Weight $2\frac{1}{2}$ lbs., rather over.

Second quill longest; third shorter than first; bill greenish yellow, darker along ridge; nail black. Feet larger and coarser than those of the mallard, reddish yellow, webs darker. Tail of eighteen acute feathers, none recurved. Top of head and little lower than eyes dark brown, nearly black, shot with drake-green. On the lower neck there is a white collar, which does not extend to the back of the neck; there is also a white spot on chin. The remainder of the plumage is blackish brown, the feathers more or less margined with a lighter

brown; in some cases almost a reddish brown. On the breast and belly the feathers are mixed with others which are gray, finely undulated—indeed, exactly what we see in the mallard. On the lower back and upper tail-coverts the edges of the feathers have a distinct dark greenish gloss. The under tail-coverts are mixed, part dark-brown with a lighter edge, the rest dark bluish green. Tail uniform dusky; greater and lesser wing-coverts dusky gray, with a faint greenish gloss. Ten of the secondary quills with their outer webs violet, purple, or bluish green, according to light; under wing-coverts and axillaries dusky grey. This bird rose in silence, flew rapidly, and was extremely wild and shy: it was a long way out of shot when first flushed; but I marked it drop some distance down the beck, where I afterwards shot it.

September 27. First woodcock seen.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
September 30, 1869.

Ornithological Notes from Norfolk—January to September, 1869.

By HENRY STEVENSON, Esq., F.L.S.

(Continued from S. S. 1496.)

JANUARY.

Goosander.—Between the 1st of January and the 9th of February six fine birds, four males and two females, in adult plumage, were killed, out of a flock of about sixteen, on Lord Suffield's lake at Gunton, near Cromer. These birds usually make their appearance on the water, with other wild fowl, in October or November, but are not easily accessible, and seldom exceed eight or ten in number.

Wild-fowl.—On the 30th, after a few days' severe frost, the following birds appeared for sale in the Norwich market:—two immature male goldeneye ducks, two immature male smews, several fine adult tufted ducks and pochards, wild duck and mallard, two immature red-throated divers and about two hundred dunlins, all from the neighbourhood of Wells and Blakeney. An adult male smew was killed at Hockwold, about the same date, and another seen.

Little Gull.—An immature specimen shot at Yarmouth, about the 24th.

Roughlegged Buzzard.—An immature bird killed at Rollesby, on the 23rd.

Sea Eagle.—On the 25th, as a son of the Rev. A. Pyne, of Horning, was walking in a field near his house, in pursuit of a hen pheasant which he had just seen alight there, the pheasant suddenly squatted, and instantly a large bird of prey swooped over the gunner's head and carried off the pheasant from the ground. Mr. Pyne did not fire, as his father is desirous of having such birds preserved, but he had no doubt as to its being an eagle, from the view he had of it when passing close over him.

Shoveller and Longtailed Ducks, &c.—On the 23rd a fine adult male shoveller was shot at Rollesby. On the 17th a nearly adult male of the longtailed duck (scarce), at Lynn; and an adult male merganser, at the same place, on the 13th.

Wild Swan.—Two hoopers shot in the estuary at Lynn, on the 24th, out of a flock of five.

Peregrine.—On the 11th a falcon of this species was seen by John Gally, the gamekeeper at Northrepps, near Cromer, chasing one of the green parrots, which are there kept at large in the grounds of Lady Buxton. Both birds ascended to a great height, till he lost sight of them, going towards Felbrigg.

FEBRUARY.

Sclavonian Grebe.—A bird, in winter plumage, was killed about the 6th near Yarmouth, and another on the 28th.

Velvet Scoter.—A fine adult male shot off Hunstanton beach.

MARCH.

Greenfinch.—Large flocks of these birds have appeared lately. On the 16th I saw more than a dozen hanging up in bunches at a poulterer's shop, *all adult males.*

Dipper.—On the 17th a single example of this bird was shot at Buxton Mills, and sent, in the flesh, to the Norwich Museum. Like all preceding Norfolk-killed specimens that I have seen, this has the black breast of the Lapland race.

Crossbill.—A large flock seen at Northrepps, near Cromer, on the 16th, and a small flock on the 20th.

Puffin.—An immature bird, with small bill but slightly grooved and dark-coloured cheeks, sent me from Salthouse on the 15th. An immature male was shot at Wells on the 26th.

Shoveller and Pintail Ducks.—A pair of shovellers killed at Lynn

on the 1st, and an adult male on the 22nd; also a pair of pintails, at Babingley, on the 1st.

Ruddy Sheldrake.—An adult male shot at Snettisham, on the 26th, as recorded in the 'Field,' &c., at the time, proved to be a foreign specimen escaped from confinement.

Merlin.—An adult male was caught alive in a singular manner, on the 14th, at Swardestone, near Norwich. The hawk was seen by a lad to dash after a small bird, which was flying towards an oak tree for safety. Oddly enough the merlin so entangled itself in the branches, some twenty feet from the ground, that the boy climbed up and caught it, in spite of its determined attacks upon his fingers. The bird, only slightly injured in the wing, is still alive.

APRIL.

Redthroated Diver.—A fine adult bird, with good red throat, was shot about the 2nd of this month.

Shoveller Duck.—An adult pair, but unusually small, were shot near Lynn, on the 19th.

Montagu's Harrier.—An adult female killed at Northrepps, near Cromer, on the 25th.

MAY.

Blacktailed Godwit.—An immature bird killed at Hickling on the 8th.

Crane.—To the interesting account, by Mr. J. H. Gurney, jun. (S. S. 1841), of the cranes killed this spring in Norfolk and other localities, I need only add, that the bird killed in Manham saltmarshes, on the 25th of May, proved to be a young female. The man who captured it kept it in confinement till the 5th of June, when it died and was stuffed for the Lynn Museum. It was fed on whelks, worms and mussels. The young male shot at South Pickenham, on the 4th of June, had several white worms, about three inches long, in the stomach; also pebbles and small white Mollusca, about the size of peas.

Rook.—A pair of rooks from a small colony which nest in the trees of Swaffham church-yard attempted to build on a gurgoile, or stonehead, projecting under the eaves on one side of the church, but the sticks and other materials were constantly stolen by their companions, and they gave up the attempt. This strikes me as a very unusual circumstance with this species.

Blackcap Warbler.—A nest of this species, with two eggs, was found, on the 1st, in a garden at Reepham. When first seen the male, or black-headed bird, was sitting. The next day the female, or brown-headed bird, was on the eggs.

Tufted Duck, &c.—I saw two ducks of this species on Hoveton Broad on the 17th of May; they had been unusually plentiful there throughout the winter. The keeper assured me that he had seen one or two last year as late as June. Wigeon were still on those waters this year up to the first week in May, and a bittern was heard there on the 16th.

Harriers.—Several very fine examples of our three species of harriers were killed this month in different parts of the county. On the 13th I had two immature hen harriers, male and female, and an adult male of Montagu's harrier, killed at Hickling. On the 22nd another adult male Montagu's harrier, also from Hickling, and a very old male marsh harrier, shot off a tree in Catton Park, near Norwich. The secondary quills and greater wing-coverts in this bird were very gray, and the tail-coverts more gray than brown. The crown of the head was dirty white, streaked with brown; the breast and under parts generally bright chesnut. Another marsh harrier, immature, with straw-coloured head, was shot at Hickling, about the same date. On the 20th of May an adult male of Montagu's harrier was killed at Somerton, near Yarmouth; and on the 24th an immature female of that species, in the same neighbourhood. The latter had a nestling thrush in its stomach.

Hawfinch.—A pair of these birds, I regret to say, were shot at Brooke, near Norwich, on the 14th. The female contained three eggs nearly ready for exclusion.

Great Spotted Woodpecker.—A pair shot at Bawdeswell, on the 19th. The female contained eggs, but small.

Kentish Plover, &c.—May 27. I was shown to-day, in the flesh, an adult male of the Kentish plover, rare in any plumage on our coast, also a black tern; both killed at Yarmouth.

Golden Oriole.—An adult female was killed at Brooke, about the 28th of May: the largest eggs were about the size of hemp-seeds.

Turtle Dove.—These birds, which of late years have visited us in greatly increased numbers and nest abundantly in our fir-plantations, have been more than usually numerous this summer.

Turnstone.—A fine pair shot at Cley, on the 30th, in nearly full summer plumage, and another pair on the 3rd of June.

JUNE.

Hawfinch.—On the 22nd an adult male of this species was shot near Norwich. The stomach contained green peas and larvæ of the currant moth.

Hobby.—An adult male shot at Somerton, near Yarmouth, on the 19th, had the remains of a sky lark in its stomach.

JULY.

Hen Harrier.—An immature hen harrier shot at Hainford, on the 3rd.

Kestrel.—The Rev. J. Burroughes informs me that early this month a nest containing seven young kestrels was taken out of the bell-turret of Brandall Church, near Norwich. He has seen most of the nestlings in the village.

Sky Lark.—From the same informant I also learn the following curious fact. A nest of sky larks having been brought up by hand at the Thorpe Lunatic Asylum, near Norwich, where different birds are kept to amuse the patients, a second batch of nestlings was taken, and being placed near the first were entirely fed by them, as also a third batch of nestlings taken a few weeks later.

Little Stint.—A bird, in full summer plumage, was shot at Yarmouth on the 16th, and two others about a week before.

AUGUST.

Shoveller and Garganey Ducks.—Saw a female shoveller, which by her actions appeared to have young ones close by, and a pair of garganey teals, at Longmere and Foulmere, on Wretham Heath, near Thetford.

Land Rail.—An unusual number of these birds appear to be scattered over the county, in localities favourable for them.

Hooded Crow.—I have recently seen three hooded crows, killed on Mr. Fowler's estate at Ganton, near Lowestoft, in Suffolk. Respecting these birds Mr. G. G. Fowler writes me that a pair have been seen about there all the summer, and on the 29th of July three were seen together, but all apparently of the same age. One was observed to have some difficulty in flying, and may have remained through an injury. Since these three were shot another had been seen. The three I have examined are certainly all old birds, and if one may judge by the almost bleached look of the gray portions of the plumage,

are probably very old birds. Did the infirmities of age induce these venerable crows to give up the perils of migration, with an eye to the eggs of pheasant and partridge instead of grouse?

Eagle Owl.—The bird stated by Mr. Tegetmeier, in the 'Field' of September 11th, to have been shot wild in Norfolk, was a young bird of the year, escaped from confinement at Northrepps, near Cromer. See 'Field' of September 18th.

HENRY STEVENSON.

The Death's Head and the Bees. By the Rev. CHARLES BURY, M.A.

I HAVE been a keeper of bees from my youth upwards, and I have expended some thought, and a little money, in trying to establish an improved system of bee management for my poorer neighbours—a system at once practicable and profitable, within the compass of their pocket and of their intellect.

Now I have read, as has everyone else at all conversant with apiarian literature, in connexion with bees, of certain remarkable doings of the death's head moth (*Acherontia Atropos*), of its love of honey in the general, and of its boldness in particular in entering the hives and regaling itself uninvited on the stores laid up therein by the bees for their own and their master's benefit. I have read, too, that on the bees assailing the intruder, he or she, as the case may be,—*i.e.* the moth,—has the tact to utter certain sounds so nearly resembling those emitted under some circumstances by the queen bee, that upon the utterance thereof the angry assailants immediately fall back and allow this bold usurper of their sovereign's voice to leave the hive without further molestation, after satisfying itself with a fabulous quantity of honey. Now as this remarkable proceeding is stated as a fact, known of their own knowledge by men of veracity and careful observation, it was not for me or the like of me to doubt its correctness. Nevertheless it is always pleasant to verify in one's own experience the observations and statements of others; and so, if I have had that satisfaction, at least in part, it may be also satisfactory to your readers to be able to add to the list of authorities upon the subject the name of an old contributor to the pages of the 'Zoologist.'

Be it known, then, to all who care to know it, that my bee-hives—at least some of them—occupy a sort of balcony just outside the

window of my study, situated on the first floor; and as I sit at my open window the busy hum of my industrious little neighbours sounds pleasantly. Well, on the 15th of June, I resolved to what is called technically—*i. e.* in beemaster's language—"raise" one of these hives, which was crowded with bees, but seemed indisposed to swarm. The process of *raising* consists, as some of the readers of the 'Zoologist' possibly may not know, in placing a flat-topped hive beneath the stock, with a connexion between them. To effect this I had to mount a ladder and face the bees—not exactly the safest or pleasantest position! I succeeded, but the bees were not well pleased, and poured out in a continuous stream, covering the entire front of the hive. Few took wing, for it was evening twilight. While watching their proceedings from the ladder something so like a bat flitted round that it did not attract my particular notice; but on going up into my study I leaned my head out of the window to within a foot of the entrance of the hive, and I then saw what I could not fail to recognize as a death's head moth flit backwards and forwards once or twice before the hive, dash at the entrance, penetrate the cluster of bees and disappear within! I leave to apiarians, entomologists, *et hoc genus omne*, to imagine my surprise and pleasure. But what was to be done? I had nought save a small net intended for landing trout, not catching moths, to aid me in the capture; so rigging it out I waited anxiously with net in close proximity to the hive to intercept the intruder on his egress. In about five minutes out she (for it is a female) came in no small bustle, and as I thought I could distinguish, but it was almost dark, with five or six bees attached to her legs. Instead of taking wing the moth scrambled, fast enough, over the cluster of bees to the top of the hive, and my net was instantly upon her. The bag of the net, however, fell over the cluster, and though I had the moth safely within, I had also within and without and hanging among the meshes some hundreds of bees. The consequence was I could neither catch the moth with my fingers nor bring the net into my room; and after running round and round with marvellous celerity my prisoner effected her escape: she was off like a shot. Next evening I kept watch and ward for my friend Atropos: she appeared, dashed against the window, and I saw her no more.

Now, I have to add, certain sounds, which I should best describe as a rather musical squeak, I distinctly heard, apparently from within the hive; but whether those sounds at all resembled the notes, real or

imagined, of the queen bee, I cannot tell, never having succeeded in catching the sounds attributed by others to her apiarian majesty.

Now for the sequel: this morning (2nd of October) I was arranging a piece of carpeting, with which the above-mentioned hive had been covered all the summer as a protection from rain, when, lo! between the folds, sleeping, it may be, the unquiet sleep of satiety, there lay my friend—at least a moth of the same species; and, inasmuch as the perfect insect is by no means common with us, I have little doubt of her personal identity. It is the finest British specimen I ever set eyes on. As it has never been seen flying about since the 16th of June, I more than suspect I have afforded this dear lover of honey lodging as well as board all these months; in fact, that my lodger descended every evening, resorted to the stores within the hive, made a hearty supper, and then quietly went up to bed again in the old carpet.

I will just add, that in captivity this moth on being touched emitted sounds, feeble but distinctly heard by sharp ears, corresponding with those I heard from the interior of the hive in the summer.

CHARLES A. BURY.

Rhinoceros Horn toppling forward, &c.—Visitors to the Zoological Gardens, Regent's Park, are likely to have remarked how very much the long single horn of the old female Rhinoceros indicus inclines forward, as a consequence of its own weight and of the attachment of it merely to the skin, so that it is movable to a considerable extent. This circumstance is at once suggestive of the idea entertained by the South African traveller Chapman and others, that the alleged Rhinoceros Oswellii is no other than an old and very long-horned example of R. simus, with its anterior horn inclining forward in like manner. I shall not be greatly surprised if, in one of her moods of violence, the female rhinoceros at the Gardens detaches her horn from the skin, as happened three or four years ago with an animal of the same species at Moscow, the horn of which is now preserved in the museum of that city, while the creature has developed another horn in its place. That the horn of a rhinoceros, which consists merely of agglutinated hair, is liable to be occasionally thus shed (or rather knocked off), occurred to me many years ago on my obtaining the facial portion of the skull, with the skin and two horns attached to it, of an old male of R. sumatranus. From the small size of its horns, I at first supposed the animal to have been adolescent; but, upon maceration of the specimen and removal of the skin, it was at once perceived, from the complete anchylosis of the facial bones, that the animal must have been considerably aged, and the idea at once occurred to me that its first horns must have been cast or shed, and that others had been developed in their places. If the forehead be examined of the old female rhinoceros in the Regent's Park, it will be

perceived that there is a considerable excrescence in the centre of it, which is no other than a diminutive horn; and this illustrates the rudimentary third horn which has occasionally been observed in different two-horned species of the genus, inclusive of the Asiatic R. sumatranus. The anterior horn of the last-named species occasionally attains an extraordinary length and high amount of regular curvature backward, and such an example of it in the British Museum was formerly considered by Dr. Gray to denote a peculiar species, which he named R. Crossii; but I have seen the horns of the same species upon the head, sufficiently developed in like manner to show at a glance that the alleged R. Crossii must be put down as a synonym of R. sumatranus. I learn from Professor Schlegel that R. sumatranus inhabits Borneo as well as Sumatra, and it is likewise generally diffused over the Indo-Chinese countries and Malayan peninsula, as is also the lesser single-horned R. sondaicus, *i.e.* that formerly supposed to be peculiar to Java; whereas the great R. indicus seems to be confined to the base of the eastern Himalaya, inclusive of the valley of the Bráhmáputra and the hills immediately southward of that valley, where the three Asiatic species would appear to meet. I once received satisfactory information of the two-horned R. sumatranus having been killed in Assam, where it is considered an extreme rarity; but I have been quite unable to obtain authentic information of R. indicus having been observed in any province of British Burma, where R. sondaicus has been repeatedly mistaken for it, as likewise in the Bengal Sundarbáns. [This note is published anonymously in the 'Field' newspaper, but I am favoured with the name of the writer, and know him to be an excellent zoologist.—*E. N.*]

Dimensions of large Elephant.—I send you the dimensions of a rogue elephant killed by a friend in the Wynaad Jungles, not long ago. As I do not remember myself ever hearing of a wild elephant, fairly measured, of such a size, I send it to you in case some of your readers may be able to inform me on the point. Height at shoulder, taken by three cross sticks, 11 feet 9 inches; length all over, from extremity of trunk to root of tail, 25 feet 5 inches; eye to tip of trunk 7 feet 7 inches; eye to root of tail 13 feet 4½ inches; tail 4 feet 6½ inches; length of tusks 5 feet 2 inches. I am aware that the tusks are nothing unusual, but, out of a great many elephants I have seen, I never heard of one of such bodily bulk. [Although I have no reason whatever to doubt this statement, which appears anonymously in the 'Field,' I think it most important that it should be authenticated with a real name.—*E. N.*]

Living Birds sold at Moscow.—Here and at St. Petersburgh there are a good many shops where live birds are sold, and even a small market for them. Many of our rarer British birds may be seen at these places, such as the nutcracker, pine grosbeak, crested tit, shore lark, bluethroated warbler, pied flycatcher, golden oriole and waxwing, and even large birds, as the crane, stork, raven and buzzard. Yesterday I saw a white quail: the man asked twenty-five roubles for it, equivalent to £3 15*s.*, which will give some idea of the value the Russians set on an albino.—*J. H. Gurney, jun.; Moscow, September* 13, 1869.

Ornithological Notes from Henley-on-Thames.—1869. April 29. A cream-coloured thrush shot near Nettlebed Wood: there was a white one in company with it, which fortunately escaped. May 3rd. Swifts about in some numbers. 7th. Stonechat's nest

with eggs. 26th. Nightjar's eggs. June 12th. A black tern shot. August 22nd. Saw a wheatear.—*E. C. Stubbs; Post Office, Henley-on-Thames, September* 21, 1869.

Rare Birds at Christchurch.—September 1st. Sabine's snipe. 4th. Snipe (bluish ash). 8th. Little bittern. 24th. Gray phalarope and reeve. 28th. Sabine's snipe. The snipe shot on the 4th is a very beautiful specimen, just the colour of a phalarope. The phalarope was shot by Captain Pocock in the harbour, after the late winds.—*William Hart & Sons; West End, Christchurch, Hants, September* 30, 1869.

Ornithological Notes from South Devon.—Black Tern. A young specimen of this species was shot at Torbay, on the 1st of September.

Glossy Ibis. One of these rare birds was shot on the River Dart, not far from Totness, on the 20th of September, and was brought to Mr. Shopland, the naturalist, at Torquay. It is now in my possession, and is nearly in full plumage: its colours are—bill blackish green, tinged with purple; naked skin round the eye dark olive-green; crown and sides of head (as far back as the ear-coverts) dark greenish brown, streaked with dull greenish white; neck, nape, throat and breast deep rich reddish brown; back dark rich green, enlivened with glittering shades of purple and bright green; wings and tail dark brownish green, richly bronzed with purple; below brownish green; legs and feet blackish green. I have given the colour of the ibis thus minutely as it varies to a very great extent in different specimens.

Arctic Tern. Two fine adult birds of this species were shot in Torbay, on the 28th and 29th of September. I heard of a third of these terns (a young bird) being shot a day or two later in the same locality.

Skua Gull. A number of these birds were observed in the bay on the 7th of October. The young pomarine skua answers most nearly to the description I received of these birds from a man who had observed them.—*A. de Hügel; Florian, Torquay, October* 9, 1869.

Effects of the late Inclement and Unseasonable Weather.—The effects of the late inclement and unseasonable weather upon the swallow tribe has been most distressing. Numbers of swifts took refuge and were caught in our churches; I bought several that were caged and set them at liberty; and a relation who was at the time visiting Exmouth told me that a swift flew in at the parlour-window and settled on his knee. It was blowing a gale from the north-east, and the poor birds were flying so feebly and low outside that the boys were knocking them down with sticks and stones. A flock of wild gray geese, too, came in from the sea, and after making the circuit of the neighbourhood, high in the air, went off to sea again with loud cacklings.—*John Gatcombe; 8, Lower Durnford Street, Stonehouse, Devon.*

Honey Buzzard in Norfolk.—On the 18th of September a fine male honey buzzard was shot at Webbon: it was brought by a friend to me for preservation. On dissection I found its crop and stomach to be literally crammed with wasps, larvæ and pieces of honeycomb: I took quite half-a-pint of food from them.—*T. E. Gunn; 21, Regent Street, Norwich.*

Ring Ouzel in Cornwall and Devon.—The ring ouzel pays us a double visit generally in the South of England: they may be seen in the spring months on their way to northern countries to breed, and in the autumn the old birds and the broods of the season may be observed on their southern return to the temperate countries. Flocks of these birds may be now observed on our tors and cairns on the Boughton, Brownailly and Kilmar ranges of our moors, and sometimes thirty or more may be

seen on a mountain ash together, for the sake of the berries. Although the ring ouzel moves north and south in large numbers, a great number remain in the spring and summer months on Dartmoor and the Cornish moors to breed, and may be thus observed all through the summer with their nests, eggs and young. The blackbird has been represented as displaying the most perfect symmetry and proportions in the shape and size of its several members, relatively, of all birds'; the ring ouzel is equally so.—*Edward Hearle Rodd; Penzance, September* 20, 1869.

Nest of Blackbird with White Nestlings.—During the season a blackbird's nest containing five nestlings, two white and the other three of the usual coloured garb, was discovered on Mr. Clarke's premises, at Stuston, in Norfolk.—*T. E. Gunn.*

Variety of the Wheatear.—Pratt has a variety of the wheatear, having a white splash about two inches long on the right side.—*T. W. Wonfor; Brighton.*

Willow Wren's Nest in a Quickset Fence.—This year I found a willow wren's nest with eggs, in a thick thorn fence, some feet distant from the ground.—*G. W. P. Moor; Great Bealings, Woodbridge, May,* 1869.

Chiffchaff's Nest on a Summer-house.—This year a chiffchaff has built and reared its young on the sloping eaves of a summer-house. The nest was ten feet from the ground.—*E. C. Moor; Great Bealings, September* 20, 1869.

Goldencrested Wren nesting in Ivy.—I found two goldencrested wrens' nests, during April of this year, placed against the stems of fir-trees in the ivy surrounding them, and not, as they are generally built, pendant from a fir-branch.—*E. C. Moor; Royal Agricultural College, Cirencester.*

Tawny Pipit near Brighton.—Mr. Guthrie, of Rottingdean, shot on the 6th of September two specimens of the tawny pipit, at Rottingdean. He was attracted by the unusual note of the birds: unfortunately his gun was loaded for larger birds, and they were so much damaged that Pratt has only been able to mount one.—*T. W. Wonfor.*

Rosy Bullfinch and Richard's Pipit at Brighton.—Swaysland has at the present time a living female of the rosy bullfinch (*Pyrrhula rosea*), taken by a birdcatcher on the Downs. I saw at the same time living specimens of Richard's pipit brought in by the birdcatchers.—*Id.*

Sparrows fascinated by a Snake.—Having been for many years past accustomed to make notes in matters of Natural History, I venture to send you a few lines out of my note-book for 1844, as the fact therein recorded seems to illustrate the remarks of Mr. Charles Horne, in his 'Jottings on Snakes,' in the 'Zoologist' for September (S. S. 1809). "On the 26th of August, 1844, I saw a large assemblage of the sparrows belonging to our premises on the gravel-road (under the laburnum tree by the balsam poplar), all looking one way, *viz.* towards the stem of the laburnum. Suddenly and simultaneously they all flew up into it, then quickly returned to the same spot on the gravel-path, taking up the same position; then flying up in a body as before into the laburnum, then returning, &c. While a friend and I were looking at all this, from a window on the ground-floor, we suddenly saw the cause of it. A young snake came slowly gliding across the gravel-road, and then went on along the grass-plot opposite the balsam poplar. While the snake was doing this the sparrows all accompanied it, some hopping after it close to its tail, others on either side, and as if they wished to get a little a-head of it, but apparently afraid; still they seemed pleased with it, and made a kind of merry chirping rather than any angry jangle. The snake, which was

about two feet long, moved slowly, as if in weakness. There had just been a shower, and perhaps this rendered its progress over the gravel and grass inconvenient: it went into a bush from the grass, and moved along the branches, and then curled itself up for a while near the bottom of the stem. A robin came and perched very close to it, and seemed quite to disregard us, who had our heads in the bush. More rain coming on, we left the spot, and on our return the snake had disappeared. Both robin and sparrows seemed to be under a fascination, and far more pleased than alarmed at its presence."—*Edward J. Moor; Great Bealings Rectory, Woodbridge, Suffolk, September* 16, 1862.

Jackdaws and Cows.—April 23, 1869. Early this morning I observed from my window some eight jackdaws busily employed on the backs of two white cows, tearing from them as much of their hair as they could conveniently take in their beaks, and flying off with it to their nests, which were placed in different parts of the building.—*E. C. Moor; Royal Agricultural College, Cirencester.*

Hoopoe near Brighton.—A young bird, evidently by its plumage bred here, was shot on the 15th of September, at Preston. This, taken with birds bred in Surrey, may help to establish its claim to be reckoned a British species.—*T. W. Wonfor.*

Swifts on the 15th of September at Sheerness.—I noticed a swift here yesterday. Surely this is very late? The late gales have driven a number of terns into the Medway: on Sunday last I saw a flock of thirty or forty, busily engaged fishing, within a very short distance of our sea-wall. As far as I could judge they were all the same species, *viz.* Sterna arctica.—*Gervase F. Mathew; R. N. Barracks, Sheerness, September* 16, 1869.

Nightjar in October.—On the 4th of October a nightjar was shot and brought to me: it is a young bird, and on skinning it I found an old wound on the back. May that have caused its remaining here so late?—*Stephen Clogg; East Looe, Cornwall, October* 11, 1869.

Woodpecker laying twenty-two Eggs.—Having noticed a green woodpecker busily engaged for some days boring a hole into a large ash, on the 19th of May, I enlarged the hole sufficiently to admit my hand, and found four eggs. From my last year's experience (Zool. S. S. 1515) I determined to watch the nest and ascertain the exact number of eggs the bird would lay. Passing the tree some days later I again took eggs, and continued paying visits about each alternate day, and generally taking an egg until the 19th of June. During the month (from the 19th of May to the 19th of June) I took twenty-two eggs from this nest.—*G. W. P. Moor; September*, 1869.

Partridge sitting in September.—September 1, 1869. While out shooting I was shown by a gamekeeper a common partridge sitting on ten eggs: she had been sitting about ten days: this I think is unusually late. A few days afterwards another partridge was found to have an egg in its ovary of usual size, but without shell.—*E. C. Moor.*

Number of Eggs laid by Domestic Hens.—Nine hens kept by a friend of mine laid, during last season, one thousand and forty-six eggs, making an average of one hundred and sixteen eggs for each hen: so that in this instance the fecundity of a species has been increased tenfold by domestication.—*Henry Hadfield.*

Double Hen's Egg.—On the 20th of August I was shown by a friend a double hen's egg, consisting of an outer shell of unusual size, with the natural albumen, in which floated another egg of ordinary appearance. The hen died from the effects.—*E. C. Moor.*

Abundance of Landrails.—The landrail has been unusually abundant this season in this neighbourhood. I have seen and heard of upwards of a dozen captures.—*T. E. Gunn; Norwich.*

Gray Phalarope in Sussex.—Three specimens of the gray phalarope have been recently shot in the county of Sussex, one of which was taken to Pratt and the other two to Swaysland.—*T. W. Wonfor.*

Rednecked Phalarope in the Neighbourhood of Plymouth.—A beautiful specimen of the rednecked phalarope (*Phalaropus hyperboreus*), in perfect summer plumage, was killed, on the 7th of June last, on the Hamoaze, just off Torpoint. The occurrence of this species on the coasts of Devon and Cornwall is very rare at any season, but its appearance in summer is most remarkable; indeed I had never before seen but one Devonshire specimen, and that was obtained in the autumn, and on reference to the volumes of the 'Zoologist' from the year 1845 to 1868 I find that all the specimens, save one, recorded in that publication as having been obtained in England, were killed during the autumn. At any rate the subject of the present notice is the first recorded Devonshire specimen in summer plumage, and the only one, in June, on any part of the coasts of England. It was first observed swimming about on the water in an elegant manner, performing the most graceful and sprightly evolutions in securing its food on the surface. Some boatmen tried to capture or knock it down with their oars, but being unsuccessful it was afterwards shot. It seems strange that although this species breeds in Scotland so few are obtained on our coast; and among the hundreds of gray phalaropes that I have examined from time to time captured on the coast of Devon I could detect but one example of the rednecked species.—*John Gatcombe.*

American Stint at Northam Burrows.—I have just seen the skin of an American stint, which was shot on Northam Burrows in September. The owner, who shot it, saw that the bird was remarkable in flight and note, and compared it with the description in Newman's edition of Montagu's Dictionary. I have told Mr. Vingoe, to whom the bird was sent, and who has examined the specimen with me this evening, to desire the owner to communicate the case to the 'Zoologist,' or let me do so.—*Edward Hearle Rodd; October* 14, 1862.

Nest and Eggs of the Corn Crake.—Early in June a nest of the corn crake was found in an orchard in the town: it was cut out of a bed of nettles at the foot of a large elm by the gardener, who observed the old bird skulking away among the long grass: it contained nine hard-set eggs. The nest is loosely constructed of coarse grass, interspersed with a few leaves of the nettle and ivy, a dry stalk or two, a bit of moss, and a few small feathers of a yellowish white colour, which may have fallen from the breast of the bird. In shape the nest is not unlike a large plate, rounded off towards the border; external diameter nine inches; internal diameter about four inches and a half. As neither Montagu nor Bewick mentions the size of the egg, and as Macgillivray has made an unaccountable mistake about it, stating that the egg is two inches and one-twelfth in length by one inch and four-twelfths in breadth, and as the error is repeated in the 'Abstract,' it may be as well to give the exact measurements of one of these eggs, which was one inch and a half in length by one inch and one-eighth in breadth. One of the eggs is quite differently coloured from the rest, being of a grayish white, with a slight bluish tinge, profusely spotted with reddish brown at the broad end, the whole intermixed with faintly clouded bluish gray blotches, the spots diminishing in size and number towards the point. Most of the eggs are of a light drab colour, with a

grayish tinge, and the reddish brown spots and bluish gray markings are mostly confined to the larger end, and are disposed in irregular blotches, some of considerable size. In one egg the ground colour approaches to a light brown, and is very thickly marked and blotched all over with dark reddish brown and dusky gray. But none of the eggs are of the "light cream-colour" described by Macgillivray. The eggs, though much larger and differently shaped, bear a striking resemblance to those of the missel thrush.—*Henry Hadfield.*

Greenshank and Lesser Tern at Leigh.—On the 18th of September I had the good fortune to shoot an adult greenshank at Leigh: this bird, I am told, is seldom seen there; certainly I have never before seen it during the six years I have known the place. I also obtained four specimens of the lesser tern, an adult and three immature birds.—*A. H. Smee.*

Greenshank near Yarmouth.—A very fine female of this species was sent me on the 20th of September, from the neighbourhood of Yarmouth, being exceedingly fat and oily: it weighed nine ounces.—*T. E. Gunn.*

Cape Pigeon and Gannet in Leicestershire.—Five extraordinary birds, which had evidently got out of their latitude and lost their way, have been seen recently in Leicestershire, and two of them have been captured. It is supposed they have come in a heavy gale, and were unable to get back. One was caught by Mr. Hart, of Rolleston, on the estate of G. Heap, Esq. It was exhausted by long flight, and was unable to rise again into the air. It proved to be the pintado petrel or Cape pigeon, and is a fine specimen, measuring four feet six inches from tip to tip of wings, and its body is fifteen inches long. It lived two days, but would not eat anything. The other is a still more remarkable specimen. It is a gannet, and measures from tip to tip of wings no less than six feet eight inches, the body being two feet ten inches in length. It was taken at Houghton-on-the-Hill by Mr. Tiptaft, alive but nearly exhausted. Still it resisted capture, and attacked the shepherd dog and sheep. The two strangers may be seen at Mr. T. H. Potter's, Billesdon.—*Stamford Mercury, October* 1, 1869. [Communicated by Mr. Cordeaux.]

The Cormorant inland.—On the 1st instant a fine female cormorant, in the second year's plumage, was shot on the margin of the lake at Kimberley Hall, the seat of the Earl of Kimberley. It had been observed about the lake for some days, and appeared to be rather tame. On opening its mouth I found as many as eleven individuals of the common river leach, and three others on its plumage: most of these seemed completely gorged with blood, no doubt from the body of the bird. It was in a rather lean condition, although it appeared to have fared sumptuously in its late quarters. In the course of dissection I found an entire jack of thirteen inches and a half in length; the head, lodging in the stomach, was almost entirely decomposed. The occurrence of this bird so far inland is quite an unusual event, although sometimes an individual has been caught on the river a few miles above Norwich. In carefully examining the body of the present specimen I found an old gun-shot wound on one of its thighs, with a broken bone, which had partly healed up: this impediment may probably account for its being so easily approached.—*T. E. Gunn; October*, 1869.

Little Gull at Brighton.—A specimen of the little gull, not fully moulted, was shot last week near the head of the New Pier, and was taken to Swaysland.—*T. W. Wonfor; October* 16, 1869.

Young Thrasher in Torbay.—A young specimen of this species was caught in Torbay on the 20th of August, measuring (including the tail) four feet seven inches in length. This animal, which has frequently been observed in the bay on previous occasions, and even been unsuccessfully netted, is the second of its kind that has been captured in the bay.—*A. de Hügel; Florian, Torquay, September* 26, 1869.

The last of the Ladybirds.—Like other counties we have had our swarm of ladybirds, and, although generally distributed through the district, it was only this week that their immense numbers became apparent. On Wednesday, the 8th of the month, a strong S.W. wind drove myriads towards the Humber. I was out on this day on the mud-flats after some knot, and saw incredible quantities of these insects helplessly and hopelessly (for the next tide would carry them to sea) struggling in the slime. On the Humber embankments, and for some yards inland, they were so thickly scattered as to make it hardly possible to move without treading on some at each step. In some places I counted thirty to forty in a space my hand could cover. On a single stalk of hemlock there were one hundred and thirty-five, and on a plant of this species from eight hundred to a thousand, giving it the appearance of a pretty berry-bearing shrub; on the lee-side of a post I counted one hundred and eighty-three. There appears to be three, if not four, well-marked species, the common one, however, (*Coccinella 7-punctata*), immensely predominant. I do not think birds eat these insects; at least I have not found this to be the case with any of our common species, as the rook, starling, sparrow, &c. They are hunted up by the cock-tailed beetles (*Staphylinus*), and I have often seen one of these unpleasant creatures walking off with a poor ladybird firmly clasped in its mandibles. The heavy gales of the equinox now daily carry myriads out to sea; and yet to-day, September 16th, I find the entire length (two miles and a half) of the sea-embankment in this parish more thickly covered than ever. On an average there are, along its entire length, twenty-five insects on each square foot; but this is a low average, as in every little sheltered corner, or hollow, they are crowded in dense masses. As fast as these are driven seawards their place is taken by ever-increasing swarms coming from the land. On the crest of the embankment they are thickest, gradually decreasing as we proceed inland. Either the wind or some other cause impels all alike in the same direction, one from which there is no escape, and the mud-flats and Humber finally receive these insect-armies now that their work is done.—*John Cordeaux; Great Cotes, Ulceby, September* 18, 1869.

Acari parasitic on a Cecidomyia.—I have to record the occurrence of three specimens of a minute white Acarus on a small Cecidomyia, bred from the terminal tuft of the hawthorn. The body of this Acarus is egg-shaped, slightly flattened; a fringe of silver-white short hairs surrounds the sides of the body; from this fringe there protrude at regular intervals single white bristles, three times as long as the fringe itself. Legs eight, short; a pair of setiform palpi protrudes from the mouth. These creatures were very active, perambulating their host in all directions; when disturbed they fixed themselves in an instant, no matter if to the body or the wings; but I could not detect that they trusted themselves either to the legs or the antennæ of the midge. It remains to be investigated if they are regular parasites or only accidental and trouble-

some guests. The occurrence of these mites on the body of a living Cecidomyia seems also to throw some light on one of the means by which many species of the former get transported from plant to plant. Dipterists have often been puzzled by meeting, on sundry plants (for instance, in the hawthorn-tufts or the woolly top-shoots of the wild thyme), instead of the expected larvæ of gall-flies, known to cause these deformities, with a progeny of Acari only, and hence have more than once expressed doubts as to whether the former were really the gall-makers. Now, if it could be shown that some species of these Acari met with in galls are carnivorous (and the occurrence of one kind of them on the living fly seems to go towards substantiating this view), the disappearance of the eggs or young larvæ of the fly in the galls would be accounted for. But I have also observed cases where the larvæ of a Cecidomyia are simply inquilines in the pseudo-galls of phytophagous Acaridæ,—for instance, in the maple-leaf gall of Acarus Aceris of Kaltenbach,—and would therefore advocate a strict examination of the excrescence itself, the form of which generally gives a clew to the real maker, and a discrimination between all insects resorting to it, before coming to any conclusion on the intricate question of the relations between gall-makers, inquilines, parasites and accidental visitors.—*Albert Müller; South Norwood, S.E., October* 2, 1869.

Natural-History Notes from Rio.

TO THE EDITOR OF THE 'ZOOLOGIST.'

Bloxworth, October 5, 1869.

DEAR SIR,

The following extracts from a letter just received from Mr. Henry Rogers, of Freshwater, Isle of Wight (who with his son has gone on a collecting expedition to South America), may perhaps be of interest to those concerned for the success of the trip.

Faithfully yours,
O. P.-CAMBRIDGE.

Rio Janeiro, September 7, 1869.

My Dear Sir,

* * * * While we are making our arrangements for going into the interior I will give you a few jottings (uninteresting though they may be) from my journal of our voyage out.

August 9, 1869. Left home to-day; arrived at Yarmouth, found that we could not catch the train at Lymington for Southampton, took the steamboat to Cowes, hired a boat to put us on board the "Oneida" for Rio Janeiro. Strong N.W. wind and heavy sea: just as we passed Calshot Castle a sudden gust of wind carried away our mast

and sails, completely disabling us; fortunately the yacht "Mars" (owner, Mr. R. Poppleton, of Bermondsey), seeing our signals of distress, bore down to our assistance, took us on board, treated us with every kindness, towed our disabled boat and put us on board the "Oneida"; except for this timely help we must have lost our passage. Left Southampton at 3.30 P.M., passed the Needles at 5.30, and took a last farewell of home and friends for at least two or three years. Everything on board very clean and comfortable. Seas rather heavy, and much sea-sickness among the passengers, which, however, I escaped, being a good sailor. Numbers of the Manx shearwater (*Puffinus Anglorum*) in the Bay of Biscay; very interesting to watch their peculiar flight: they seemed to be guided by a leader, every individual simultaneously showing first the dark side then the light under-side of its plumage, similar to the dunlins. A lady passenger caused much amusement by her fears, and threats to report to the Captain a design she imagined to exist for filling her cabin with coals through one of the "ventilators:" her ideas as to the use of these last arose from a joking answer to an inquiry about the purpose for which they were intended.

Thursday, August 12, off Cape Finisterre. A whale seen.

Friday, 13. Arrived at Lisbon; landed, and visited the town and market: fruit very cheap and abundant; grapes three-halfpence per pound; peaches eighteen for one shilling. Town well-constructed; inhabitants civil and obliging; scenery up the river very picturesque. Left Lisbon at 2 P.M. Large numbers of flying-fish; at times they seemed like a shower on the water.

Sunday, 15. Attended Divine Service. A bird very much resembling the Cape pigeon came on board. Numbers of stormy petrels round the ship, and several species of gulls.

Monday, 16. Off Teneriffe, 5 A.M. The different tints on the peak as the sun rose very beautiful; a village on the mountain seen to great advantage, the white roofs standing out in bold relief against the dark mountain-sides. Wind very strong (but fair). Some little excitement caused by the splitting of some of our sails, but life on board being dull, most of us felt glad of anything for a change. Flying-fish to-day by thousands, their gambols very pleasing to watch. A large turtle passed the ship, the first I had ever seen in its native element: saw also several Nautilus and cuttle-fish.

August 19. Arrived at St. Vincent; landed and set to work; captured some fine spiders and several beetles.

Pernambuco. Did not land, as a boat for us both would have cost thirty shillings, and we could only have had two or three hours on shore.

August 28. Landed at Bahia, and had four hours' ramble and scramble; captured four species of butterflies, two of beetles, some shells, a very beautiful frog, and some beautiful spiders. Bahia gives evidence of being a good collecting-ground, and no doubt far richer if one could have got into the interior. The sample of tropical forest life seen here makes us long to get to Minas; but by the time we reach that place we shall be penniless, as we hear the expenses of land-travelling are enormous: still we are determined to do our best. One of the spiders caught here is very interesting; its nest placed in a rose-bush and formed beautifully of rose-leaves, and the spider itself very difficult to discern. Some of the spiders obtained here are perfectly lovely, beyond everything I have ever conceived a spider could be.

Rio de Janeiro. All well and safely landed, after a pleasant voyage, and the kindest treatment from the captain (Reeks) and every one of the officers.

September 9. * * * * We have made our arrangements and are going up the river Doce, and to work to the interior of Menes Geraus? There are no inhabitants beyond Espiritode Santos. All the naturalists here say it is the richest collecting-ground in Brazil, but all are afraid to go up the river on account of fever and Indians; but we are off and have no fears. It will cost us about £30 to get to Santos, from whence we must get up in canoes.

Please direct letters here to the British Consul, who has promised to forward them. I will write again when we get to the Doce.

Yours truly,

H. ROGERS.

To Rev. O. P.-Cambridge.

Notes on the Mammalia of Norfolk (continued from S. S. 553).—Polecat. This is getting scarcer each year in this neighbourhood: two examples only have passed under my examination since my last notes, but I have also heard of two or three others being trapped by keepers; and during the first week of November, 1867, a very large male was exhibited at a dealer's stall in the Yarmouth Market; it had been killed somewhere in the neighbourhood.

Stoat. In January, 1868, two stoats were sent me, one almost entirely white and the other in its brown dress, without the slightest indication of change. I had always

considered these respective garbs as seasonal, and indicative of summer and winter. Not having heard of any similar instance, I think it rather unusual.

Badger. I have not heard of the occurrence of a Norfolk badger since I recorded one in 1864 (Zool. 9016), and a second in the folllowing year (Zool. S. S. 152); but omitted to record the occurrence of a female in 1862 in this neighbourhood. In 1865 a female and two young ones were captured alive in Suffolk, just beyond the boundary of this county, and were kept alive for some time in the possession of a person named Clarke, but what has since become of them I cannot ascertain.

Otter. The otter is still of frequent occurrence in Norfolk, and will probably remain with us as long as their haunts, our famous Broads, are undisturbed by cultivation; notwithstanding several are killed off every year. The undermentioned are the specimens that have passed under my examination:—January, 1868. A female and two young from North Wooton. February 27, 1869. Young one from Hickling. March 9, 1869. Two young were caught alive at Trigby, near Yarmouth, in a straw stack: the old one was with them, but succeeded in making good her escape. She is believed to have littered there—a most unusual locality, as the stack was more than three-quarters of a mile from the river. Mr. T. Southwell informs me of a fine specimen taken at Barsham about this date. An old otter, a female, and two young (about a fortnight old) were captured, about the same time, in the neighbourhood of Yarmouth; the coats of the latter presented two distinct shades of colour, one being of a very pale brown, and the other very dark, nearly as dark as the adult; the mother was slightly piebald, having a few small patches of white on the crown of its head and neck.

Mole. A beautiful cream-coloured variety was captured, in July last, in this neighbourhood.

Hedgehog. October, 1867. A gamekeeper near Norwich has lately informed me of a curious fact, illustrating the carnivorous propensity of the hedgehog. He says, "On going my rounds one morning to examine the traps I had set the night previous, I found, on approaching one that was placed at the foot of an old gate-post, a rabbit caught by its hind legs; it was jerking and tearing itself about in a fearful manner: I stood still and watched it a minute or two, when I saw a hedgehog emerge from some foliage opposite, and attack it by springing at it and fastening itself to its head, which it commenced biting and tearing, whilst the poor victim was making every attempt to escape its two-fold misfortune. So intent was the hedgehog on its prey that I approached and despatched it before it made an endeavour to escape. I then examined the rabbit and found one side of its face eaten and torn away by the repeated attacks of its foe." The carnivorous propensity of the hedgehog has been before observed, but I do not remember an instance where an individual has made so bold an attack on so large a prey, but have no doubt the fact in this case was owing to the inability of the rabbit to escape.

Rat. October 4, 1867. A male, whose entire coat was of a creamy white, excepting a few brownish hairs scattered over the crown of its head, was killed by a dog at Florden: it had black eyes. On referring to some former notes of mine I find a record of a similar variety killed near Aylsham on the 12th of October, 1860.

Squirrel. I have on several occasions been informed that the squirrel indulges in the habit of sucking birds' eggs, and in support of this assertion individuals have occasionally been caught in traps baited with eggs when actually engaged in the fact,

the offender when caught generally showing unmistakable proof of guilt by having its mouth and face besmeared with the yelk, and fragments of the shell being sometimes found attached. I have met with no particular variation in the dress of the squirrel, but have two individuals in summer dress, one with a black and the other with an entirely white tail.

Rabbit. A young male was shot at Langley on the 18th of February, 1868, having its entire coat (excepting one of its fore feet, which was white) of a glossy black: in a note in the 'Zoologist' (Zool. 9646) I have recorded a previous instance of the occurrence of this variety.

Fallow Deer. A beautiful white stag of this species, mottled with patches of the normal coloured garb, was killed at Buxton, in September, 1868, the head of which I preserved.

Grampus. A grampus, weighing 4 cwt., was brought into Yarmouth Harbour on Tuesday, the 25th of June, 1867, by the fishing lugger "Champion:" it was soon afterwards removed to this city for exhibition.—*T. E. Gunn.*

Tits and their Food.—"The relative amount of good and evil effected by our smaller birds is a constant subject of dispute, opinions being formed according to the prejudices of the advocate rather than on evidence of a reliable character. The tits are usually regarded as insectivorous; but it appears that one of the smaller species, the cole tit, has been seen in numerous flocks near London attacking the filberts, perforating through the shell and devouring the kernel. The fact is undoubted, as the contents of the stomach proved, under microscopical examination, to consist almost exclusively of the fragments of kernels. The common nuts have been destroyed in a similar manner in some parts of Nottinghamshire, but the depredators have not been detected." In reference to this paragraph, extracted from the 'Field' newspaper, having paid much attention to tits, their food, actions, &c., for many years, I would like to suggest a different motive for their attacking the filberts. As long ago as 1855 a notice appeared in the 'Gardeners' Chronicle' of the alarming increase of the oak-galls caused by the gall-fly (*Cynips Quercus*), and expressing great fears for the welfare of our oak trees and coppices, unless some check was soon put to the spread of the galls. In the May number of the 'Naturalist' of the following year I recorded the fact that the galls were being destroyed to a very great extent by titmice for the sake of the grub contained in them, and on which they were feeding; at the same time I expressed a hope that this would be a check to the spread of the threatened evil: this hope has been fully sustained, as I have yearly seen, since that time, the same destruction of the grub going on, thereby checking the threatened injury, and doing a vast amount of good. There cannot be any doubt but that the sole reason of the titmice attacking the galls is for the sake of the grubs they contain, yet I have no doubt if their stomachs were examined after so feeding that some portions of the gall would be found accidentally swallowed, but not as an article of food. The galls formed by Cynips Quercus are round and almost as hard as filberts, yet a certain instinct or other power has taught the titmice that they contain an insect in the shape of a grub which is good food for them: so I believe the same power, whatever it be, has taught them that certain filberts also contain the same *bonne bouche* for them. Hence I would suggest that their attacks on the filberts arise

from the same cause; that the grub is the great, if not the sole inducement, and that only those filberts containing a grub are so attacked: I cannot say that they may not take a portion of the kernel after they have cracked their nut, but, as it requires "microscopical examination" for the detection of the fragments they swallow, the "devouring" of the kernel can be but trifling. It would be interesting to know whether the grub in the filberts are more plentiful this year than usual; if they are, that would account for the more active attacks by the titmice on them. Common hazel nuts have been very abundant with us this year, but I have not heard of or remarked any such destruction among them, as recorded in the extract from the 'Field,' nor can I say whether or not they are more infected by grubs than usual, as I am not a nut eater. I would advise filbert-growers to make further inquiries into the matter before they commence a war of extermination against the titmice, unless by so doing they destroy their best friends instead of their enemies. Titmice were a great source of amusement to me in my youthful days, "when George the Third was King." My home was in a town containing some thousands of inhabitants; the house I resided in was situated in the centre of the town, adjoining (and the back premises abutting on) the Butchers' Market, which was open to the public but one day in the week: it was a large open square surrounded by houses, the butchers' stalls being on all sides of the square. In the winter season, during the non-market days, it was the resort of a large number of titmice, coming there for the sake of the fragments of meat, suet, &c., left adhering to the stalls. My amusement arose from trapping them, by means of a large wire-spring trap-cage, set for them in a large mulberry tree, which grew in a small plot of ground at the back of our house, overhanging the market-house, and frequently do I remember taking as many as a dozen in a day: in the evening came my chief amusement, in watching their various actions when the door of the cage was opened for them to escape: some would instantly scud away over the house tops; others would quietly hop about the tree, as if careless of their freedom; whilst some few, more irate than the others, would hop to the upper part of the tree, and there put themselves in the most grotesque attitudes, at the same time pouring out a continuous stream of chatter, whether intended as a parting blessing or otherwise I cannot say, being unacquainted with bird language. After a great many years' observation I am convinced that the harm done by titmice is vastly out-balanced by the good they do, in the destruction of the myriads of insects consumed by them as food; and I believe if they and other insectivorous birds were protected instead of persecuted and destroyed as they now are, that we should not hear of so much destruction of fruit by insects as we now do.—*Stephen Clogg.*

Jackdaws.—At Heathfield Park, Sussex, in May, 1869, I found three nests of the jackdaw, one in a rotten stump not above four feet from the ground; all with unfledged young ones. I saw great quantities in the ruins at Hurstmonceux Castle, where they have monopolized the old dovecotes in the ruined towers.—*E. D. Hamel; Tamworth.*

Nightjar at Heathfield Park, Sussex.—A good many may be seen in the park at nightfall, flying in parties of three or four close to the top of the birch plantations: they begin to "jar" about eight o'clock, and keep it up until very late. I heard them at midnight.—*Id.*

Collected Observations on British Reptiles.

By EDWARD NEWMAN.

(Continued from Zool. S. S. 1835).

THE COMMON FROG (*Rana temporaria*).

Rana temporaria, *Linneus, Systema Naturæ*, vol. i. p. 527.

There seems to me an obvious difference between frogs and toads in the character of the skin, that of frogs being moist like the mucous surface of our own lips and tongue, as if from some natural and continuous exudation, while that of toads is dry and harsh to the touch, often even making a slight rustling sound like that produced by gently rubbing the surface of brown paper. I do not know how far this superficial difference extends, that is to how many species or so-called genera, but it is very apparent in those British species with which we are familiar. The character is accompanied by a corresponding one in economy, frogs appearing to prefer moist situations generally within reach of water, and feeding by day; while toads, for the most part, frequent drier habitations, from which they emerge to seek their prey by night: in accordance with this diurnal and nocturnal activity the stomach of frogs is invariably found to contain sun-loving flies, especially of the genera Helophilus, Eristalis and Musca, while that of the toad contains night-wandering beetles and night-flying moths.

All authors agree as to the adaptability of this moist surface of the frog's skin to purposes of respiration; and all agree further as to the existence of a *cutaneous* respiration; but I am unable to quote a single author who has made the subject clear to my own apprehension. The idea originated with Spallanzani. The moist surface of the skin is supposed to be the medium of this respiration, and the moisture is said to be supplied from an internal reservoir, which Mr. Bell thus describes:—"Every one knows that when a frog is hastily seized, or even quickly pursued, it voids a considerable quantity of water, which is generally but erroneously supposed to be the urine. This water is limpid and pure, containing no traces of the usual elements of the urinary secretion: it is contained in a sac, which has also been mistakenly believed to be the urinary bladder. This is the reservoir to which I have alluded. When, therefore, the frog is happily placed in a damp atmosphere, or in water, the skin absorbs a quantity of water, which there is every reason to believe is secreted

into the bladder just mentioned, where it is kept in store until the dryness of the skin requires a supply for the purpose of respiration, when it is again taken up and restored to the surface by which it had been first absorbed."—*British Reptiles*, p. 84. Mr. Bell further states that pulmonary respiration alone is not sufficient to support life without the aid of that of the cutaneous surface. I feel it due to the illustrious naturalists who have made this subject their especial study, to make this very imperfect allusion to the interesting question they have discussed; and also in some measure to myself, in order to show that I have not overlooked their labours: at the same time I am under the humiliating necessity of confessing that I have not the slightest practical knowledge of a subject which others have studied so deeply and found so interesting. I now proceed to detail more tangible characters.

The frog has both palatal and maxillary teeth: the palatal are short, slender, sharp-pointed and slightly recurved, the latter character appearing to render the return of their living food difficult or almost impossible; this is, perhaps, the only purpose for which these teeth are provided, since for purposes of mastication they are useless: the maxillary teeth are arranged in a single series round the upper jaw, and have characters almost exactly similar to the palatal teeth: the tongue is attached to the dilatable skin of the lower jaw for about half its length, and the remaining half is folded back on itself, the extremity which is notched pointing towards the throat, and being appressed to the internal opening of the nostrils, which it appears can thus be effectually closed at the will of the animal. The air taken in at the nostrils passes directly into the lungs. The nose is rounded, almost semicircular, and the gape of the mouth wide. The eyes are bright, and placed either on a level with the general surface of the head or projected at the pleasure of the animal, a character which I noticed as being much more obvious in the edible frog, under which species I shall again refer to it. The back is humped in a very striking manner: this peculiarity is due to the structure of the skeleton, which is without ribs. The fore feet are short and have four toes: of these the second is the shortest, and the third the longest; the first and fourth are of equal length: there is scarcely any appearance of a connecting web at the base. The hind legs are much longer than the fore legs, and are well adapted both for leaping and swimming: the first toe is the shortest, the second and fourth

much longer and nearly equal in length, and the third the longest of all: they are connected by a web. As a natural result of this structure the frog swims with ease and celerity; it is a beautiful object in the water, its actions being replete with grace. The colour of the skin varies considerably, always more or less partaking of brown, but shading off to yellow, red, and green of different degrees of intensity, and always more or less blotched with darker brown: there is a large and conspicuous blotch of this darker colour on each temple behind the eye; and others form rather conspicuous transverse bands on the legs: the under side is always paler, sometimes approaching to milky white, and spotted more or less distinctly with pale smoke-colour.

The reproduction of the frog is a subject that has long engaged the attention of naturalists, and has been most successfully investigated. In the early spring the frogs are always to be found congregated in shallow ponds for this especial purpose, the males, which are almost invariably smaller than the females, generally preponderating in number: the females appear to be pregnant, although no copulation has yet or does at any time take place: as in insects, the eggs are full grown and to all appearance perfectly ready for extrusion without fecundation. This object is accomplished in the following manner: the males follow the females in the water, and each, mounting on the back of a female, grasps it round the waist immediately behind the fore legs: so entirely devoid are the frogs of that conjugal affection we see exhibited in some birds and sucklers, that it appears a matter of the utmost indifference to what object the male thus attaches himself: he will very commonly embrace any toad which he happens to meet with seeking the water for the same purpose of procreation; and sometimes this act is performed so energetically and his grasp is so tight as to strangle the wretched toad: more than once have I caught a frog thus attached to the dead body of a toad, and that so firmly that I was unable to separate them: thus unnaturally loaded, the frog will continue in the water for weeks, dragging with him his offensive burden. Very frequently two male frogs will attach themselves to one female; less commonly three; and in one instance I have found four so attached. On the indifference of the male frog as to the object to which he will attach himself, the Rev. H. Harpur Crewe gives a striking instance.

"Whilst staying at Rossway, near Berkhampstead," writes Mr. Crewe, "I noticed the following curious circumstance: I was walking along the bank of a small fish-pond in the garden, which was swarm-

ing with frogs and toads busily engaged in spawning, and was astonished to notice a great number of them promiscuously *in copulâ*. In every instance but one tha came under my notice the union was between the male frog and the female toad, but in that one instance it was *vice versâ*." (Zool. 4097.)

It is also by no means a rare occurrence to find two males thus attached to each other; and Mr. Bell mentions an instance of two frogs attaching themselves to a pike: after quoting the famous passage from Isaac Walton about the Bishop in Bohemia and the Bishop of Thurgo, Mr. Bell proceeds thus:—"I have often heard my father relate an instance of a similar fact, though with somewhat more adherence to the simple truth of the case. As he was walking in the spring on the banks of a large piece of water at Wimpole, the seat of Lord Hardwicke, he observed a large pike swimming in a very sluggish manner near the surface of the water, having two dark-coloured patches on the side which he thought must be occasioned by disease: a few days afterwards he saw the same pike floating dead upon the surface of the water, and, having drawn it to land by means of a stick, he found that the dark-coloured masses which he had observed on the former occasion were two living frogs still attached to the fish, and that so firmly, that it required some force to push them off with a stick."—*British Reptiles*, 2nd edition, p. 96.

Notwithstanding all that has been written with more or less accuracy of the obstetric talents of the male frog, I believe that the real object is to disburthen himself of the so-called milt with which he is loaded, and this being cast loose in the water finds its proper destination, exactly as is the case in the desmogenous fishes: with the female, on the contrary, the spawn seems to be retained until contact with the male informs her that it will be properly fecundated; for no sooner has the male frog taken up his position as above described, than the female commences the duty of oviposition. The eggs consist of a small, spherical and almost black centre or yelk, and a transparent mucilaginous surrounding which corresponds with the albumen or white of a bird's egg, but which has no perceptible envelope either coriaceous or calcareous: each of these eggs receives the spermatic fluid which is continually shed by the male. I cannot find any thread connecting the eggs together as in the natterjack and toad, but they nevertheless adhere in masses which are inseparable except by the application of considerable force. The spawn is deposited at the bottom of the water, and the albumen of each individual egg

absorbs water and increases vastly in bulk; thus the dark-coloured yelks become widely separated from each other, although the mass is still compact and coherent, and has the appearance of colourless transparent jelly dotted with small black beads. After remaining at the bottom a few days the mass rises and floats on the surface; and when the spawn deposited by a single frog has become thus swollen by the absorption of water, its disproportion to the size of the parent becomes very apparent: it not unfrequently exceeds her bulk at least tenfold, and those who are unacquainted with the water-absorbing process are often heard expressing their wonder that so small a body should have contained such a volume of spawn. When the spawn has risen to the surface of the water, or near it, the frogs of both sexes may be constantly observed riding upon the spawn, their heads alone appearing above the surface of the water, and occasionally bobbing up and down and emitting sonorous croakings that are described as musical, discordant, pleasing, gentle, agreeable or horrible, exactly as they happen to affect the mind of the auditor: so true is it that beauty and ugliness are not inherent qualities of the object thus described, but are conferred by the mind of the describer. These frog gatherings are very familiar to our English boys, and afford them the opportunity of indulging those cruel propensities which seem the attributes of their kind. Our German friends have viewed these love-feasts more philosophically, and many have described them in glowing terms.

The development of the tadpole from the egg, and of the perfect frog from the tadpole, have engaged the attention of naturalists in all ages; and the very striking correspondence between the metamorphosis of a frog and an insect has repeatedly been made the subject of comment. The state of egg almost exactly corresponds, and the larva of the insect is identical with the tadpole of the frog: from this stage insects vary amongst themselves: the beautiful and gradual transition from the larval to the adult form is precisely alike in the frog and those isomorphous insects which constitute the families Blattidæ, Locustidæ, &c., a fact which M. Quatrefages appears to have overlooked, when, in the admirable passage I am about to cite he comments with perfect truth on the absence in the life of the frog of any state "like the apparently torpid condition of the pupa." It is here most manifest that he has been in the habit of regarding all insect metamorphosis as amorphous.

On the metamorphosis of frogs, however, M. Quatrefages stands pre-eminent, and his observations are so immeasurably superior to my own that I shall copy from Dr. Lawson's translation.

"The development of frogs presents another curious phenomenon. It is this: the young animal, after it has left the egg, and before it has become a larva, is still in a semi-embryonic condition: at this period the digestive tube and its appendages are exceedingly rudimentary. The greater portion of the body is filled by a large mass of yelk or vitellus, enclosed by the skin, which has been formed for some time; and it is at the expense of this alimentary matter that the development proceeds. The external characters are in keeping with the imperfect condition of the animal at that period: the head is large and appears to be divided in two on the under surface, each half being prolonged as a sort of process by which the animal attaches itself to surrounding objects; as yet there are no traces of either eyes, nostrils, respiratory or auditory organs; and the belly, of an oblong form, is continued posteriorly as a short tail bordered with a ribband-like membrane. This primitive condition, however, does not last long. About the fourth day after birth the head, which is now as long as the body, has somewhat the appearance of a thimble; the mouth is provided with a pair of soft lips; the nostrils, eyes and auditory apparatus have made their appearance; the head is separated by a deep groove from the belly, which has assumed a spherical form, and from which spring a pair of opercula, clothed with little branching gills; and the tail has grown so much that it is now quite as large as the body. The mouth is very soon armed with a horny beak, capable of dividing the vegetable food; the intestine, which is now very long, becomes more fully formed and assumes a spiral arrangement; the tail is elongated and widened, and the little creature is then called a *tadpole*. At this period one of those alterations occurs which are so intimately associated with the ideas we are endeavouring to convey, that we must not pass them by in silence. Our larva first breathed by its skin alone, and afterwards by a pair of little branching gills attached to the opercula: about the seventh or eighth day, however, the opercula are gradually soldered to the abdomen, and the gills fade away and disappear. At the same time a set of new and more complex branchia are developed, in chambers situate on either side of the neck. The new gills are arranged in tufts attached to a solid frame-work of four cartilaginous arches, and are about a hundred and twelve in number for each side of the body. Here we see a rapid

substitution of one organ for another, though both discharge their functions in the same manner, inasmuch as the respiration is just as aquatic in character after the alteration as it was before it. But the modifications of the respiratory apparatus do not cease here: before the tadpole can become a frog, it must do away with these second gills and replace them by lungs; and at the necessary time, a set of changes takes place analogous to those we have already described. The vascular tufts are atrophied, and the lungs, which till now were solid and rudimentary, open up and increase in size. The circulatory organs are correspondingly modified. The calibre of the large branchial vessels is diminished, and the pulmonary trunks increase in number and diameter. Later on, the solid parts of the branchial apparatus disappear also, the bones and cartilages being gradually reabsorbed. Eventually the alteration is fully accomplished, and there remains not the slightest trace of the former branchial apparatus. In this instance, not only has there been transformation and substitution, but an actual metamorphosis has occurred; for the respiration, which was aquatic before, has become atmospheric, and, strictly speaking, the animal, from having been a fish has been converted into a batrachian. If we examine any particular apparatus, we shall find it also presenting many curious phenomena in the course of its development. We shall find that as the herbivorous habits give place to carnivorous ones, the digestive apparatus undergoes a change adapting it to the new form of diet: the mouth increases in size and gape; the little beak organs, or, more correctly, the horny lips, are replaced by teeth, which are attached to the palatine arch, and not to the jaw; the intestine, which before was long and almost cylindrical, becomes shorter, and is inflated in certain portions of its length; and the abdomen, which had been almost spherical, becomes thin and slender: the metamorphosis may now be seen in its entire extent, and more distinctly as regards the locomotive system than any other.

"The tadpole at first exhibits no trace of either internal or external limbs; it swims about like a fish by the action of its tail, which is an extensive organ, longer and wider than the body, supported by a prolongation of the vertebral column, moved by powerful muscles, and supplied with large blood-vessels and numerous nervous branches: beneath the skin and muscles of the anterior and posterior regions of the body, two little projections appear at a certain period; these are the limbs, and are at first attached to the adjacent structures by the nerves and blood-vessels which are supplied to them: these pro-

jections increase in size, their appendages appear in due course, and eventually the hip and shoulder bones are developed. As soon as these locomotive organs enter upon the discharge of their functions, the tail begins to disappear. Its skin, muscles, nerves, bones and blood-vessels atrophy and vanish from our sight: they have not faded away, they have not simply fallen off, they have not been cast off by a species of moulting, as in the case of insect larvæ; they have been got rid of by none of these methods; their substance has been reabsorbed atom by atom; and hence, although it has ceased to exist, it is not the less alive on that account. We see, then, that frogs undergo complete metamorphoses not only in regard to their entire organism, but as to each set of apparatus, with the exception of the nervous system."

Clear and precise as is this account of the metamorphosis of frogs, there are not wanting naturalists who maintain that although the metamorphosis I have described is usual, yet that it is not necessary. In the April number of the 'Annals and Magazine of Natural History' for the year 1853, a Mr. Edward Joseph Lowe, F.G.S., &c., published a paper 'On the reproduction of frogs and toads without the intermediate stage of tadpole': it is a paper of great interest, and is not altogether unsupported by the previous observations of naturalists. Mr. Lowe fortifies his position by stating that young frogs have been dug out of the ground in the month of January: he writes thus:—"In digging in the garden amongst the strawberry-beds in the middle of January, a nest of young frogs was upturned: these were apparently three or four weeks old. This ground had been previously dug in the month of August, and many strawberry plants buried; it was amongst these plants in a state of partial decomposition, that these young ones were observed." I may remark that the statement scarcely establishes the author's idea that frogs may be matured without passing through the tadpole state, for it is quite as likely that a frog which had passed through the tadpole state as one which had not, should occur in the situation described. Mr. Lowe goes on to state that frogs are bred in cellars where there is no water for tadpoles, and continues thus:—"In mentioning this subject to Mr. Sidebotham, of Manchester, he informed me that young frogs, and in fact frogs of all sizes, were to be seen in his cellar amongst decaying dahlia-tubers: the smallest of them were only about half the size of the young frog when newly developed from the tadpole. He further stated that there

was no water in the cellar, and no means of young frogs entering, except by first coming into the kitchen, a mode of entry if not impossible, highly improbable. Mr. Sidebotham never found any spawn." This observation goes rather beyond Mr. Lowe's hypothesis, for it not only dispenses with the tadpole, but proved the non-necessity of spawn also.

My notice of Mr. Lowe's paper induced the Rev. Alfred Merle Norman to send the following communication to the 'Zoologist' for 1853:—"Mr. Edward Lowe's paper on the reproduction of frogs without the presence of water, which appeared in the 'Annals' for April, and is quoted in the 'Zoologist,' is one most deserving the attention of all naturalists. In support of Mr. Lowe's fifth observation, I cannot help sending you these few remarks:—'Year after year I have observed the same circumstance, and to account for it has always been to me the greatest puzzle. It was in a wine-cellar that the frogs were seen, the exact position of which I must first attempt to describe. This wine-cellar had no other entrance than a close-fitting door, under which a moderate-sized frog could not possibly pass; nor do I think that even young ones, such as those seen, could have done so, but of this I cannot speak for certain: this door opened into a dairy, having a window communicating by a small area with the garden. Minute frogs were found continually, two or three years following, among the damp sawdust in the cellar: they were very small, not larger than if they had just assumed the perfect state. And now, as to how they got there: is it possible that they were brought into the cellar with the sawdust, and, from want of food, did not increase in size during that lengthened period? I should say not. We have now two propositions left—either they must by some means have found their way into the cellar, or they must have been bred in it. The nearest water to the cellar was a small pond in a field separated from the garden by a deep walled ha-ha: but I have never seen any tadpoles in that pond, nor do I think it likely there would be any there, as the water is very pure, coming from a spring not far off, and running in and out of the pond in a continued stream. But granting, for the sake of argument, that the frogs might have been bred there, to have reached the cellar they must have crossed the field, mounted the perpendicular wall of the ha-ha, traversed the garden, passed through the area and window into the dairy, and thence under the door into the wine-cellar, and this, too, in a party of some dozens!'"—*Zool.* 3912.

To the conclusions at which Mr. Norman seems to have arrived I ventured at the time respectfully to demur: the argument seems in all cases to run thus:—Suppose it impossible for the little frogs to have gained access to the situations in which they were found by any ordinary means such as those suggested, by passing through a kitchen, &c., how did they get there at all? Surely no one will venture on spontaneous cellar generation! and if it be admitted that the phenomena of generation and parturition took place at all, the parents must have entered by some way, although Mr. Norman says there was no means of entrance but under a close-fitting door. Now, if the parents *did* get in by any means whatever, it seems to me that the much smaller young ones *could* get in: the climbing of the wall of the ha-ha seems to me to offer no kind of difficulty to a frog, as we shall presently see.

The observations of Mr. Lowe, Mr. Sidebotham and Mr. Norman attracted very considerable attention, some writers dissenting from the inferences implied by their communications; and one, Mr. Garland, narrating a circumstance which supported if not established them. "I had a wine-cellar," says Mr. Garland, "about ten feet long by eight wide at the end, and leading out of a back kitchen, below the level of a small garden situated in the High Street in the middle of the town of Dorchester. There was only one door to the cellar, and one small window opening on a little square space with a railing over it upon the level of the garden, the path of which was flagged with large paving-stones. I had a wooden shutter fixed on the inside of my cellar, to increase the facility of obtaining an equable temperature for the wine, and which was constantly kept up and fastened. I found some large frogs in it the first year I went to the house; these I had taken out and the cellar thoroughly cleaned. I am quite sure no others could have obtained access thereto through the window, and, of course, they could not through the two kitchens; yet, to my great surprise, the next year I found frogs in considerable number, and of different degrees of size, some very small. They were again got rid of in like manner, and the cellar cleaned; but the same occurrence the happened next year: there was no sawdust, the wine being packed on laths."—*Zool.* 3989.

I leave the subject here, only inviting attention to the fact that the frogs thus apparently produced in or by the cellar, were "of different degrees of size," a fact that seems to raise additional doubts as to their origin. These interesting extracts are inserted here because of

their bearing on metamorphosis. I now revert to the tadpole, concerning which, and as to its being in the ordinary course of nature a larval or imperfect frog, there can be no doubt. The food of this familiar object has been gravely discussed and much disputed: in reply to a question by Mr. Chennell on this subject, I received the following conclusive observations from the pen of Mr. Richard Quain Couch, a gentleman whose early death was a severe loss to the science of Natural History, and one perhaps never to be repaired.

"In answer to your correspondent, Mr. Chennell (Zool. 579), on the subject of the food of the tadpole and the frog, I beg to offer him my experience on the point in question. Soon after the tadpole has effected its liberation from the spongy envelope of the egg, it adheres, by means of a pair of hooks on the breast, either to the empty egg or to some other substance near; although it is frequently found lying on its side at the bottom of wells or ditches. In this state it is entirely inactive, or at most its activity consists in only occasionally flapping its tail: at this stage it takes no food, and must therefore be nourished by the remains of egg within it. As the temporary external branchiæ disappear, the tadpoles become more and more active, and proportionably more voracious. At this time they very actively search for food, though they do it without the least intelligence: they generally, when in confinement, place their mouths against the bottom of the vessel, and search indiscriminately in all directions to obtain it: and although on many occasions food was designedly placed near them, yet they never, in any instance, turned to it as if they perceived it either by sight or smell, but came upon it by accident: so it is also where they are at liberty in the ponds and ditches. They are said by some authorities to prefer a vegetable diet, and from some accounts indeed they might be supposed to reject all animal food; this, however, does not appear to be the case. In those which I have kept in confinement, I found that when I fed them on the water-cress, supposed to be their favourite food, they lived contentedly on it for about twenty-four hours, and then the strongest would attack their weaker companions, and in the end devour them. This act of cannibalism was generally prevented by feeding them on animal diet, but still they always showed a preference for their weaker companions. During the earlier stages of their development they are very active and voracious, but as the development goes on and the arms and legs are getting useful for progression they get very inactive, and their appetite nearly leaves them. In this state they lie very

inactively at the bottom of the vessel, or leave the water and take shelter among the wet grass, and beneath stones in moist situations. So situated they become an easy prey to their more active and less advanced fellows, which rarely pass them without a bite. Hence, in this transition state from the tadpole to the frog, they are frequently found in a very mutilated condition. So voracious is their appetite, that if an individual in this helpless and advanced stage be left through the night with the others, it is sure to be found in the morning dead and half devoured. While their appetite is thus so voracious, it is not easily satisfied; for if a bit of beef or mutton be offered to them, they will fasten on it immediately they discover it, and remain so for seven or eight hours at a stretch, and then only give it up by force; and though they may be actively devouring it all that time, yet at the first favourable opportunity will return and renew their attack as if they had been kept without food for a week; provided it be animal food nothing comes amiss, and hence it is not to be wondered at that they should be found feeding on the common white slug, as your correspondent noticed. On more than one occasion I have found these young cannibals congregated into large black masses, busily occupied with something, their heads being placed centrally and their bodies regularly radiating from one point, they resembled a large black composite flower. On driving them away I have found them feeding on the dead body of a full-grown frog, and probably the very one that had given them birth. They have no kind of affection; anything in the shape of food is acceptable."—*Zool.* 676.

No sooner has the tail totally disappeared and the usual limbs of a frog been produced, than the mode of respiration becomes totally changed, and the metamorphosed animal instead of being purely aquatic becomes strictly amphibious, residing at pleasure in the water or out, just as it finds most agreeable: it is at this period that those remarkable migrations take place which have attracted so much attention, and have induced so many fabulous accounts of showers of frogs, accounts which it is quite impossible for a naturalist to believe, and equally impossible to persuade the non-naturalist to disbelieve. Certain atmospheric conditions are no doubt essential to this general movement among the juvenile frogs: it usually takes place after a shower, when the surface of the ground is moist: a certain amount of atmospheric humidity seems also absolutely essential to the successful prosecution of this migratory march. The frogs at this period often seem to radiate in all directions, some of their number taking up with

the first congenial resting-place; others, more difficult to please, passing on and on until they find a locality exactly adapted to their taste. Here they establish a kind of home, shaded by or partially concealed by overhanging leaves, and here they lie in wait for their prey.

I have never seen a frog make even the slightest attempt to devour a lifeless object. I have tried in vain to tempt them with dead butterflies, dead beetles, dead cockroaches, and dead grasshoppers; but all to no purpose: life, or at any rate motion, seems necessary to impart a relish to the meal. Some writers have asserted that frogs devour plant-lice or aphides, and thus render a most important service to the gardener; but this I have been altogether unable to verify: the aphides with which I have tried to tempt a tame frog, failed to attract his attention: they were, as is their wont, of too lethargic a disposition to attract his notice, but a fly held buzzing between the fingers would at once excite him, and would disappear with a celerity that seemed altogether at variance with his usual sedate behaviour.

It has been often noticed as a fact worthy of record that a frog has been observed climbing a wall, or seated on the top of a wall, in a position he would not have attained by any ordinary means of progression. These records arise for the most part from our ignorance of the locomotive powers which a frog not only possesses, but very commonly employs. The Rev. C. A. Johns, a most observant zoologist, thus alludes to this phase of frog-life:—

"Three several instances, proving that frogs can and do climb, have fallen under my own notice: these are already recorded in print. A fourth came under my notice on the 27th of October last. I was digging for pupæ at the base of a large willow tree in the valley of the Itchen, near Winchester, with some young friends, when one of the party exclaimed, 'Look at this frog climbing up the tree!' I quickly ran round to the other side of the tree, and saw not one only, but five or six young frogs, from one to two feet from the ground, climbing up the rugged bark, and using their front and hind feet just as a sailor employs his hands and feet when ascending the rigging of a ship. One, which I did not myself see, was discovered at a height of five feet from the ground in the act of descending. It had been alarmed probably at our intrusion, and had fallen to the ground before I reached the spot; but I had no reason to doubt the accuracy of the statement, for two or three members of my party pointed to the exact spot from which it had fallen; and if a frog can climb two feet, there is no reason why it should not climb twenty or more."—*Zool.* 8861.

Mr. Reeks, in reference to this narrative, says, "Although I have never had the good fortune to observe frogs in actual progression up trees, I have frequently found them in, apparently to them, inaccessible places, such as the tops of pollard willows in the vicinity of streams — situations, in fact, which could only be attained by climbing."—*Zool.* 8927.

Frog history is so attractive and so abundant that it would be an agreeable and easy task to extend this chapter to a still greater length, but I forbear, leaving the Romance of their Natural History to be worked out by others: their longevity and abstinence whilst immured in stone or coal are prolific fields for the sensation naturalists, to whom I must abandon this most tempting theme.

EDWARD NEWMAN.

Notes from Spurn Point. By JOHN CORDEAUX, Esq.

OCTOBER 11th, 12th and 13th, 1869.

THERE is no season more favourable for an ornithological ramble on our eastern shores than the first fortnight in October; whether we choose the Lincolnshire coast, or that of Holderness, for our "happy hunting grounds," we are almost sure to obtain something worth having, and to find much more that is worth seeing and remembering. An invitation from a friend to join his yacht for a three days' cruise off Spurn and the mouth of the Humber came most opportunely for my purpose, and on the afternoon of Monday the 11th, I went on board the cutter lying in the Hawke Roads, Grimsby. At four in the afternoon we were anchored, under shelter of the land, half a mile to the N.W. of the Spurn lights.

In a former volume of the 'Zoologist' (S. S. 1317) I have given a short account of the long narrow ridge of sand-hills known as Spurn Point, extending trunk-like from the coast line of Holderness and terminated by the two lighthouses marking the entrance to the Humber, dividing the main sea from the estuary of that river. The nearest village is that of Kilnsea, four miles from the Point, and the average breadth of the promontory at spring-tides probably not much over one hundred yards. The whole coast is much of the same character, although on a smaller scale, as that described by Mr. St. John as fringing the Moray Frith. On the Humber side there is at low water a wide extent of mud-flat and mussel scalps exposed, the

chosen haunt of hundreds of waders, which here feed in comparative safety. It was now low water, so, taking a couple of breech-loaders and a supply of cartridges, we landed on one of the banks. Scarcely did the keel grate along the gravel, before a multitude of gulls rose and flew out seaward, the greater part crossing the sand-hills. There were greater and lesser blackbacked gulls, old and young birds,—the latter species in considerable numbers,—herring, common and brown-headed gulls. We walked for two hours across these gravel-flats, till the returning tide washed up to our feet: curlews, knots, dunlins and gray plovers rose a-head and made off along the edge of the water in straggling lines of flight, each sounding his own alarm-note. Not a bird could we get near, excepting the godwits, which were alone approachable, and my first shot brought down a fat heavy "bartail." During the three days we spent at Spurn we found this species most common on the coast, and might, had we been so inclined, have shot several.

We did not reach the "cutter" till after dark, ringed dotterel rising close upon us, from each shallow pool, at almost every step, their clear melodious whistle heard above the roar of the surf. It was a brilliant night, each little star glittering with frost in the cold northern sky. A walk on deck, listening to

> "The grating roar
> Of pebbles which the waves draw back, and fling,
> At their return, up the high strand,
> Begin, and cease, and then again begin,
> With tremulous cadence slow, and bring
> The eternal note of sadness in."

and then to bed, rolled up in blankets on the couches in our snug little saloon.

October 13th. Up at 5.30, and on shore at six. A gray sea-roke drifting in across the sand-dunes, but aloft the pink cirri spoke of a fine and clear day. As we landed five mallards rose from the water's edge; and near the Point flocks of the common scoter were flying from the sea into the Humber; great and lesser blackbacked gulls hovered along the edge of the side; flocks of twites and linnets passed twittering overhead, coming in a direction along the sand-hills from the Yorkshire coast and flying towards the Point. There are thousands of the northern linnet now at Spurn, the ripe seeds of the sea-purslane, a common plant on these sand-hills, are the great attraction.

I distinguished the note of the snow bunting, and saw a single bird of this species perched on the "tide-ridge."

8 A. M. Went off to breakfast and found a pair of guillemots in winter plumage, swimming near the yacht. An attempt to bag them was a failure.

9.30 A. M. When rowing ashore two strings of tern passed overhead. I recognized the common and lesser terns, both of which species breed at Spurn. There is also another tern which nests in small numbers here, namely, the Sandwich (*Sterna Boysii*). Few young birds get off: their breeding is a mere farce, as I find a regular trade is carried on from this place with collectors. In the breeding-season an almost daily search of the coast is made and every egg found is taken. This short-sighted policy must ultimately drive the birds to seek out some less frequented situation for their summer residence. On landing we walked round by the Point towards the sea-side of the hills, and thus came in for a very interesting sight: a school of forty or fifty porpoises was passing out to sea from the Humber, and within gun-shot of the shore. Some of these were of large size, and fully ten feet long: they swam in two irregular lines, and the constant rolling over of so many dorsal fins at once was most striking. Now and then some big fellow would spring almost sheer out of the water. In front of the porpoises a mixed flock of gulls was hovering and screaming, making dashes at any little fish driven to the surface by these sea-dogs. Hundreds of dunlins were seen on this part of the coast, and one small flock of snow buntings. During the night some small parties of goldcrests had arrived and were scattered amongst the "marram" on the hills near the lighthouses. The name by which these little fellows are known at Spurn is that of "woodcock pilots," as they invariably arrive a few days in advance of the woodcock. No bird is more frequently taken at sea on board the fishing-smacks at this season than the little goldcrest, and in foggy weather hundreds perish. In rough thick weather it is only the strongest of their race that can pass the "swan-bath" of the Viking—the wild north sea.

I noticed during the day several common wrens on the coast, and have regretted ever since not procuring specimens, as they struck me as a slightly larger and stronger bird than the wren of our gardens, and may perhaps have proved representatives of the northern species. On the summit of about the only bush on the promontory was a beautiful male brambling (*Fringilla montifringilla*), which my friend shot. Near the same place were a few stonechats.

As we walked over the sand-hills we disturbed numbers of moths, the yellow underwing and silver Y, and many red admiral and lesser tortoiseshell butterflies. I remarked several species of Fungus; amongst these the common "hinkhorn." The only plants now in flower were the ragwort and the pretty pink crane's-bill. During the morning we got long and fruitless shots both at the sheldrake and redthroated diver: the latter bird had the throat white. Returning across the mud-flats on the Humber side of the hills my friend got a long right and left, bagging a godwit with his first, and a fine immature male great blackbacked gull with his second barrel: it was only by wading out far and deep that the latter was recovered. Near the chalk bank, where some years since the sea broke across into the Humber, I saw two rock pipits, the only birds of this species seen. The hooded crows arrived about the 9th, and were now everywhere in small parties foraging along both coasts.

At 3 P.M. we were on board again, weighed anchor, and setting main, fore and jib sails, stood across towards the opposite coast; passed the Haile buoy off the dreaded "Donna Nook" on the Lincolnshire side, and then tacked and ran to the east of the Newsound light-ship. Our object was to look up the redthroated divers. Several guillemots and two or three puffins were seen, but, so far, no large divers. At last I caught sight of two swimming together, about a quarter of a mile away off the starboard bow. We had an exciting chase, and although we got out the boat to circumvent them, they finally escaped: there was scarcely any breeze at the time, and the divers went to windward much more rapidly than we could. The glass showed one of these birds to have the cheeks and front neck pure white; the other and larger of the two had the throat dark. I dare not say how many shots were fired, but having only No. 6 in the cartridges is some extenuation of our failure—at least we choose to consider it so. Another dark-necked diver never let us approach nearer than three hundred yards. At 6.30 P.M. we were back at our anchorage off the Spurn lights.

October 13th, 6 A.M. Again on shore. The only valuable bird seen during our morning walk was a Richardson's skua: it was flying close in along the coast, but took precaution to take a wide sweep out to sea when opposite our lurking-place. This same bird had been observed during the morning from the yacht, harrying the "brownheads." There was a stiff breeze now blowing, making it necessary to get on board again immediately. The wind had chopped suddenly north.

Half-an-hour later and the "little lady" was beating out of the bay, with a heavy sea running. Near the Bull-float light-ship we picked up a heavily laden boat containing three men and a boy, considerably done up: the poor fellows had pulled for twenty-six hours without intermission, having separated from their smack in a fog twenty miles from the Humber mouth.

During the run home a small bird flew across our bow suspiciously like a little auk. My friend had seen a similar bird off the mouth of the Humber during the previous week, and thought it a young guillemot, but this could hardly be the case at this season.

During our short stay at Spurn we had seen thirty-eight species of birds. An interesting feature of the autumn Ornithology of the Point was the juxtaposition of summer and winter visitors: thus along the coast where the terns were fishing ran troops of knot, godwit and gray plover. On the sand-hills twites, bramblings and snow buntings fed, while troops of swallows were still careering aloft in full vigour and enjoyment.

I have to thank Mr. Richardson, of Beverley, for the following notices of birds shot at or near Spurn during the autumn:—

Spotted Redshank: Knot in Summer Plumage at Spurn.—A Mr. Beautyman, innkeeper, Beverley, was at Spurn on the 23rd of August, and shot an immature male spotted redshank; also a male knot in full summer plumage.

Stork (Ciconia alba) *in Holderness.*—Mr. Richardson saw at Mr. P. Lawton's, innkeeper, Easington, a white stork, which was shot near Withernsea, early in September, by a man named Crawforth.

Peregrine Falcon and Curlew Sandpiper at Spurn.—A gentleman who was at Spurn, with Mr. Richardson, early in October, shot on the 8th a peregrine falcon, a male of the second year, and on the 9th a male curlew sandpiper from amongst a flock of dunlin.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
October 19, 1869.

Life-Histories of Sawflies. Translated from the Dutch of M. S. C. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.

(Continued from S. S. 1736.)

NEMATUS BETULÆ, *Hartig.*

De Geer, Mémoires (Goetze's translation), ii. 2, p. 261, tab. 37, fig. 23.
Hartig, Blatt und Holzwespen, p. 219.

Nematus fulvus, capite fusco, thoracis dorso ac pectore nigro maculato, alis iridescentibus, stigmate fusco luteo-marginato, tarsis posticis fuscescentibus.

We are, I believe, indebted to De Geer for all that is at present known about this insect. Hartig has simply copied the description of the Swedish naturalist, and appears never to have seen the insect alive, either as larva or imago. De Geer's very short description comes after that of Nematus perspicillarus, *Klug*, which species is mentioned by Hartig under the name of Nematus melanocephalus, and agrees very closely with the one under consideration.

I had at first intended to have followed the example of my predecessors, and treated of these insects in succession: I was, however, afraid that this would oblige me to postpone both descriptions for too long a time, as I have not met with the larvæ of perspicillaris during the last fourteen years, and my drawings only give the larva in its very early and its latest stages; I also found that I had no representation either of the pupa, the cocoon, the egg or the perfect insect: I thus thought it better to divide them, however nearly they may be related, and describe, in the first instance, the metamorphosis of Betulæ, the less known of the two species.

Having by means of her saw made openings in a birch leaf, the female deposits her eggs between the epidermis and the parenchyma, on the under side of the leaf. I found some leaves, which had been thus attacked, on a small birch tree in my garden, early in June, 1862. The larvæ on quitting the egg were entirely of a blackish green colour, and ate out the substance of the leaf between the veins, but left untouched the point of the leaf, as also the places or little receptacles in which the empty egg-shells were concealed, so that in this condition the leaf had the appearance of our fig. 6, in which *a a* represents the places where the eggs have been deposited.

After the first moult the young larvæ were of the size represented at fig. 2 on our plate; fig. 3 representing the same larva

magnified $2\frac{1}{2}$ linear. The whole body was divided into folds by numerous wrinkles; the colour on the dorsum was dark green; the sides and the ventral surface, together with the twelve prolegs and the two anal legs, were grayish green, somewhat yellowish here and there, more especially on the sides of the eleventh and last segments. The head and a triangular mark on the anus were shining black; the thoracic legs grayish black, annulated with white. These larvæ when feeding usually raised the last five or six segments of the body in the air.

Some time later, in the month of June, when they were half-grown, their colour was somewhat different. I noted their appearance at that time as follows:—head sordid dark green; body green, yellow at the sides, with an orange spot on this yellow portion of each segment, except on the last two. The whole body was covered with little oval dark warts. All the legs pale green; the thoracic legs with black claws. A black spot on the anal valve, and below it, on either side, a pale green spine having a black point.

Some days later—namely, on the 22nd of June—they had moulted for the last time, and had now the appearance represented in our fig. 4. The following are my notes of it. Head brownish black, the posterior margin and the trophi being paler; the dorsum of the abdomen deeply wrinkled, dark green, becoming paler towards the apex, where the colour has that peculiar reflection which is also observed on the skin of the larvæ of Notodonta dictæoides. On the sides of the segments from the first to the eleventh are yellow spots of a somewhat triangular form; see fig. 5, representing the side of the fifth segment. Between and below these yellow spots the colour is pale green; the ventral surface and all the legs are likewise of this tint. The thoracic legs are armed with brown claws. The entire body is covered with oval and elliptical shining black spots; of these three are above and three on the before-named yellow spots, one in advance and two behind on each segment, added to which there are two transverse spots above each leg. Above the anus is a large ill-defined black spot, and on each side below this a green spine with black tip.

When full-grown the larvæ were 22 mm. long. They were very voracious, and moved about very rapidly in the box, in which some of them were kept. On the birch tree, however, I observed others almost always quiet and feeding. They seem to be lovers of freedom who find even a roomy prison too narrow. When one of these larvæ was touched by an Aphis the former moved its tail rapidly about;

they did not, however, carry this part of the body raised in the air, and, so far as I was able to observe, they had no ventral glands.

After reading the description of my larvæ, it may perhaps be considered that I have no right to call this species by the name of Betulæ, *Hartig*, as there is a considerable difference in the descriptions of the larvæ by De Geer and myself. However, De Geer says expressly, and Hartig repeats the same words, "Sonst ganz glatt, ohne Punkte und Flecke;" that is to say, in addition to the yellow spots on the sides. I at once acknowledge that this difference is very great; and yet I am more willing to suppose that De Geer may have been mistaken than that there is a third species agreeing in almost all points with the perspicillaris of Klug and the Betulæ of Hartig, and also, like the latter, feeding on the birch.

On the 25th of June the larvæ spun up on the surface of the mould, which I had put into the box. The cocoons were of a more or less dark brown and simple: this forms one of the characteristics of the species. The imagos made their appearance on and after the 12th of July. The female is 7 mm. long, expanding to 15 mm.; the male is a little smaller. The head in both sexes is brown as far as the antennæ; the margins of the black compound eyes and a crescent above the antennæ are brownish yellow, the ocelli black. The antennæ are sordid brown with pale rings on the joints. Mouth yellowish white, with shining brown mandibles.

The thorax in the female is yellowish orange, with three shining black spots on the superior surface and four on the inferior; the former are broadly elliptical, one, in advance, being on the central lobe, the other two a little behind on the lateral lobes (fig. 7). Of the four on the breast two are in the form of triangles on either side of the neck on the prothorax, while the two others are at the extreme lowest point of the mesothorax. In the male the three dorsal spots are united into a single large round spot, in which the scutellum makes a notch; this latter is brownish and posterior to it, between and behind the cenchri, is an irregular black spot. The abdomen is orange, paler in the female than in the male. The sheaths of the saw are brown; the anal styles yellow. Legs yellow; in the female the posterior tarsi are brownish, decidedly brown in the male. All the claws are brown; between them are rather large pulvilli.

The wings are translucent, strongly iridescent, and have a yellow tinge at the base. The costal and postcostal nervures are yellow, margined with black on the inner side; the externo-median nervure

with its branches is black, the remaining nervures are brown. Stigma brown, with a pale inner margin.

The imagos appearing, according to our observation, in July, points to the conclusion that there are two generations in the year, the second of which most probably winters in the cocoon. I think I remember to have seen the larvæ of the second brood, but as I have not made any note of this circumstance, I cannot state it as a fact.

Ornithological Notes from Stirlingshire: July to October, 1869 (continued from S. S. 1799).—July 13. To-day received a pure white egg of the kestrel, which was taken out of the bird, on the 14th of May, in Selkirkshire. *Note.*—Also this year received an almost pure white egg of the merlin from the same locality, which was taken from the nest: a few small black specks at the large end faded much shortly after it was taken from the nest.

August 4. A white jackdaw, which has been frequenting this locality for some time, first observed by me to-day. I watched him for some time through a glass: strictly speaking, his colour was not white, but a dull ashy or silvery gray, the head and breast being of a darker or smokier? tinge. He was much persecuted by others of the tribe, as well as by the rooks, though at the same time, individually, they seemed rather afraid of him. Since the above date I have seen him repeatedly, but of late he has disappeared.

August 6. But few birds have as yet arrived at the coast. I shot a couple of oystercatchers and some other common species, but saw nothing rare there to-day.

August 21. A local collector here informed me to-day that in one small wood he this season discovered two pairs of nightjars' eggs and one pair of young birds: the wood is not above two acres in extent.

September 1. Whilst partridge shooting to-day, near the river-side, I saw distinctly a green sandpiper—the first I have heard of in this county.

September 5. Saw plenty of sanderlings on the coast, and shot four specimens.

September 7. Not a sanderling to be seen, though other species were as abundant as usual. Got one whimbrel out of a company of three: these birds, I believe, in autumn are commoner on the east coast than on the west. Bartailed godwits were not quite so numerous as in some seasons.

October 18. Gray plover in considerable numbers on the coast: I saw twelve in one flock, and shot three others: a distinct though faint shade of golden colour was visible on the feathers of the back. Saw a flock of about twenty shieldducks, principally males, and a good many other ducks out at sea.

October 20. Only saw one gray plover at the coast, but there were few birds on the beach of any kind.

October 29. Woodcocks, as usual here, arrived with the first frost of the last two days, and snipe also; the latter in considerable numbers. Ducks are now plentiful on the Firth.—*John A. Harvie Brown; Dunipace House, Falkirk.*

Rare Birds near Hastings.—A little gull was shot from a boat a few days ago: it was flying in company with terns at the time. A fine raven and a female snow

bunting have also been shot on the Levels here. A stormy petrel was observed, about the same time, some little distance from the shore. A gray phalarope was shot on the beach near Bover Hithe, early in the present month. Three wild ducks alighted in the artificial water in the park here last week, and stayed all day with the water-fowl. Whilst I write it is snowing fast.—*Alwin S. Bell, 3rd West India Regiment; Hastings, October* 28, 1869.

Dartford Warbler in St. Buryan, near Penzance.—I have not hitherto detected this little warbler in the Penzance district; but I have seen a specimen to-day which was obtained by Mr. Vingoe's son yesterday in Trevider Moor.—*Edward Hearle Rodd; Penzance, October* 30, 1869.

White Partridges (? Ptarmigan) near Ganton, Yorkshire.—"Perhaps it would be interesting to some of your numerous readers to hear that two brace of beautiful white partridges have just been shot in the preserves of the Rev. R. H. Foord, of Foxholes Rectory, near Ganton. It is known there are a few more birds of this description in the same place, and this circumstance has raised considerable curiosity, as such birds have never before been seen in that neighbourhood. Their great rarity has induced the Rev. R. H. Foord to have them stuffed, for which purpose he has sent one brace to Mr. J. Darley, birdstuffer, Dock Street, who will be happy to allow anyone curious on the subject to inspect them whilst in his charge.—*Jno. B. Grainger; 35, Liddell Street, Hull, October* 19, 1869." The above, recording the capture of some white partridges (probably ptarmigan) near Ganton, in Yorkshire, is a cutting from the 'Hull and Eastern Counties Herald' of the 21st of October.—*Alwin S. Bell.*

Little Bustard on the Lizard Land.—A very fine bird of this species (which from its size I should think was a male) came into the hands of Mr. Vingoe, for preservation, yesterday, from the Lizard. The plumage was entirely plain from the throat downwards, showing no traces of the crescentic black markings which characterize the male in summer plumage. The roseate tint which pervades the basal parts of the feathers and the down on the back and breast next to the skin quite equal in intensity the under plumage of the roseate tern. The Lizard district has afforded both bustards to the Cornish Fauna: the great bustard in my museum had been obtained from that neighbourhood.—*Edward Hearle Rodd; October* 30, 1869.

Rednecked Phalarope at Marlborough.—A specimen of the rednecked phalarope was shot by one of our pupils, Featherstone, who lives with his father in the town. The bird's plumage was in the transition state between its summer and winter dress, but, having been submitted to Mr. Newman, there is no doubt about the species.—*T. A. Preston; Marlborough College.*

Extraordinary Flight of Landrails.—Have you heard of the extraordinary flight of landrails which visited this neighbourhood in the early part of September last? Landrails are usually very sparsely distributed through this district,—an open corn-growing country,—and three or four in a season are about as many as I usually meet with. During the first week of September I found upwards of thirty in three days, and on a neighbouring property the owner killed upwards of fifty (seventeen in one small clover-field of two acres), and probably found a good many more. All these birds were lean and poor, and came in with a north-east wind.—*W. O. Hammond; St. Alban's Court, Wingham, Kent.*

Winter Puffin at Marlborough.—A specimen of the puffin was caught by hand on the banks of the Kennet, on the 25th of October. The postman, George Scott, whilst

walking by the river, noticed the bird, and as it appeared to be a strange visitor, he procured some assistance and ran it down. It was in very poor condition, probably having been driven inland by the rough weather of September, and only just able to support itself in its new home.—*T. A. Preston.*

Varieties in Lepidoptera.—Having for many years continued experiments on the larvæ of Arctia caja without any marked results, I this year tried another of a different nature. I selected the tortoiseshell butterfly, as one of the least variable species we have, and I procured several broods of young larvæ just emerged from the egg. These I kept in a dark box until I had all ready, and then I divided each brood into three lots, putting one-third into a box in my photographic room, which is lighted with orange-coloured glass, one-third into a box lighted with blue glass, and the ventilators carefully shaded, so that only light of a blue colour could reach the larvæ; the remainder were put into an ordinary cage, in the natural light. The latter fed up and came out into butterflies in the usual time. Those in the blue light were not healthy, and though every care was taken at least fifty or sixty died before changing, and a considerable number changed into chrysalides, and then died: those that came out into perfect insects were very much smaller than usual. Those lighted by orange-coloured glass fed up very well, but many of the two first lots had come out before one of them changed into chrysalis; scarcely one of them died, and I examined each one before I allowed it to fly, to see what effect had been produced. I retained a few specimens of each lot, and now proceed to describe the difference. Those reared in the blue light differ from the ordinary form in being on an average much smaller; the orange-brown is lighter in shade, and the yellow and orange run into each other, instead of being distinct and separate. Those reared in the non-actinic or yellow light are also smaller; the orange-brown is replaced by a salmon-colour, the venation more strongly marked, and the blue dashes at the edge of the wings in the usual form, are in these of a dull slatey colour. One evening I found about sixty butterflies out of chrysalis, of those in the photographic room, and taking each one carefully I examined them all and allowed them to fly; shortly afterwards I found the whole of them had settled against the wall of the house, and presented a most remarkable appearance: they remained there more than half an hour: the western sun was shining against the wall, and it is not unlikely, when being suddenly brought from the red light where they had spent all their lives to the bright daylight, they had been so dazzled as to act in this peculiar manner. The results of this experiment do not show any very startling change in colour, such as one would have expected from the known effects of light on plants, and from the very much more strange varieties one now and then meets with, which cannot have been subjected to such severe treatment: still when we consider that even this difference is caused in one generation, and in the course of a month, it is a very suggestive fact, and leads one to think that light has certainly as much or more effect on the colours of Lepidoptera than the difference of food, and might in a long series of generations lead to very material changes in both form and colour, and perhaps considerably modify our ideas of what constitutes a species.—*Joseph Sidebotham; Manchester.*

E. NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.